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TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1935

In Equity

No. 11, Original

THE STATE OF WASHINGTON, COMPLAINANT,

vs.

THE STATE OF OREGON

Stipulations and Exhibits

FILED OCTOBER 14, 1935.

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Stipulations and Exhibits

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IN SUPREME COURT OF THE UNITED STATES

October Term, 1932

No. 11, Original

THE STATE OF WASHINGTON, Complainant,

v.

THE STATE OF OREGON

ORDER APPOINTING SPECIAL MASTER—February 20, 1933

The return of the complainant to the rule issued herein to show cause why this case should not be dismissed for the want of prosecution, is received and filed.

The motion for the appointment of a special master is granted, and it is ordered that William W. Ray, Esquire, of Salt Lake City, Utah, be, and he is hereby, appointed special master in this cause, with authority to summon witnesses, issue subpoenas, and to take such evidence as may be introduced and such as he may deem it necessary to call for. The master is directed to make findings of fact and conclusions of law, and to submit the same to this Court with all convenient speed, together with his recommendations for a decree. The findings, conclusions and recommendations of the master shall be subject to consideration, revision or approval by the Court. The master shall be allowed his actual expenses and a reasonable compensation for his services to be fixed hereafter by the Court. The allowances to him, the compensation paid to his stenographic and clerical assistants, and the cost of printing his report shall be charged against and be borne by the parties in such proportions as the Court hereafter may direct. If the appointment herein made of a master is not accepted, or if the place becomes vacant during the recess of the Court, the Chief Justice shall have authority to make a new designation which shall have the same effect as if originally made by the Court herein.

[fol. 3] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 1—RELATING TO DESCRIPTION OF STREAM SYSTEM, ETC.

It is hereby stipulated by and between the undersigned counsel for the respective states:

I.

That the rights specified in the abstract of water permits by the State Engineer of the State of Oregon, and in the decrees of the Circuit Court of said state for Umatilla County, in the following named cases, towit:

(1) Decree on the mandate In the Matter of the Determination of the Relative Rights to the Use of the Waters of Walla Walla River, etc., made and entered under date of February 25, 1933.

(2) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Pine Creek, etc., made and entered under date of March 17, 1924.

(3) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Middle Branch of Mud Creek, etc., made and entered under date of September 11, 1916.

(4) Decree In the Matter of the Determination of the [fol. 4] Relative Rights to the Use of the Waters of East Branch of Mud Creek, etc., made and entered under date of November 28, 1910.

(5) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Dugger Creek, etc., made and entered under date of March 5, 1917.

(6) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Goodman's Springs' Branch, etc., made and entered under date of June 29, 1911.

(7) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of Johnson Creek, etc., made and entered under date of September 11, 1916.

(8) Decree In the Matter of the Determination of the Relative Rights to the Use of the Waters of South Branch of Mud Creek, etc., made and entered under date of November 29, 1910.

(9) Decree In the Matter of Determination of the Relative Rights to the Use of the Waters of West Prong of Little Walla Walla river, etc., made and entered under date of September 11, 1916—

and that the rights specified in the abstract of water permits issued by the State Supervisor of Hydraulics of the State of Washington and in the decrees of the Superior Court of that State, Walla Walla County, in the following named cases, towit:

(1) Decree In the Matter of the Determination of the Rights to the Use of the Waters of the Walla Walla River, etc., No. 19075, made and entered under date of September 12, 1928.

(2) Decree on Remittitur In the Matter of the Determination of the Rights to the Use of the Waters of Doan Creek, etc., No. 14293, made and entered under date of December 1, 1923.

(3) Decree In the Matter of the Determination of the Rights to the Use of the Waters of Stone Creek, etc., No. 15409, made and entered under date of July 10, 1923—

[fol. 5] are hereby accepted and admitted as the relative individual rights of the parties named therein, and of their successors in interest, in their respective states, for the use of water, in the amounts, for the purposes, and at the places or on the lands, set forth in said respective permits and in said respective decrees.

II

That copies of said abstracts of permits and of said decrees shall be admitted in evidence in this case as competent proof affecting the respective rights of the two states, provided that the admission of the same, or of any part thereof, in evidence in this case, shall not be construed as, or held to be, an admission, waiver, abridgment or modification of any of the rights of either state as against the other in this case, relative to the following:

(1) The rights of the Gardena Farms District, successor in interest to the Walla Walla Irrigation Company.

(2) The water requirements of the lands to which water is awarded in any or all of said permits or in any or all of said decrees.

(3) The classification of soils of the lands watered from the streams of the two states.

(4) The past and present physical conditions of the Tumalum section of the Walla Walla River in the State of Oregon, and their relation to the diversion of the water of the stream through the Little Walla Walla River to the rights served thereby and to the diversions from the streams in the State of Washington.

(5) The relation of wells and of the rights of the users thereof for irrigation in the State of Oregon, to the stream system and to the rights of lower diverters therefrom for lands in the State of Washington.

(6) The underground waters of the lands in the State of Oregon, and their relation to the supply of water in the stream.

[fols. 6 & 7] (7) The past and present use of water by diverters of water in Oregon as against diverters in Washington, and its relation to adverse use and estoppel, and the distribution of water in Oregon as a separate stream system.

III

As and when sufficient data is secured by the respective parties hereto, the issues in the matters enumerated in Subdivisions (1) to (7) of the foregoing paragraph shall be more specifically stated and defined, in statements to be filed herein and furnished opposing counsel, and, as far as possible, eliminated by additional stipulations of counsel.

Dated at Walla Walla, Washington, this 21st day of October, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Att'y Gen of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 8] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION No. 2—RELATING TO DECREES AND PERMITS, ETC.

It is hereby agreed that the following is a true statement of the description of the stream system of the Walla Walla River, together with an agreement as to the settlement of certain rights and the elimination of certain streams from the issues of this case, towit:

I

The Walla Walla River rises in the western slopes of the Blue Mountains in Northeastern Oregon. Two branches, called the North Fork and the South Fork, unite about four miles above the city of Milton. From this point the river flows through a narrow irrigated valley, approximately one-half mile wide, until it reaches Milton, where the river divides in a delta formation. The pipe line of the city of Milton diverts water from the South Fork at a point in the Southeast quarter of the Southeast quarter of Section 22, Twp. 5 North, Range 36 E. W. M., and furnishes water for its power plant, which is located in the Northwest quarter of the Southwest quarter of Section 18, Twp. 5 North, Range 36 E. W. M. Couse Creek, flowing from the west, enters the main stream a short distance [fol. 9] above the city of Milton and just below the city's hydroelectric power plant.

The delta formation comprises lands in Sections 12, 1, 2 and 3, Twp. 5 North, Range 35 E. W. M., and in Sections 34, 35, 36, 25, 26 and 27, Twp. 6 North, Range 35 E. W. M. The first division of the stream in this delta formation is immediately below the bridge crossing the river in the Southwest quarter of the Northeast quarter of Section 12, Twp. 5 North, Range 35 E. W. M. At this point the stream divides into the Little Walla Walla and the Tumalum (as called in Oregon) or Main Walla Walla (as called in Washington).

The Little Walla Walla in turn, after flowing a distance of about a mile, at a point in the Northeast quarter of Section 2, Twp. 5 North, Range 35 E. W. M. (called locally "The Frog"), divides into the Ford Branch and the Crocket Branch. It is at this point that the water is measured into the ditch of the Milton, Freewater & Hudson Bay Irrigation Company.

The Crocket Branch, immediately below, divides into the East and West branches of the Crocket, and the West branch of the Crocket divides into three prongs. The two easterly of these prongs join, about a mile and a half below, the East branch of the Crocket, and discharge into the East Prong of the Little Walla Walla Spring Branch, which in turn empties into the East Little Walla Walla River across the line in the State of Washington. The East Little Walla Walla River discharges into the main stream near the Northeast corner of Section 10, Twp. 6 North, Range 35 E. W. M., in the State of Washington.

The several prongs of the West branch of the Crocket, which unite in the Northeast quarter of Section 26, Twp. 6 North, Range 35 E. W. M., with the East branch of the Crocket to form the East Prong of the Little Walla Walla River Spring Branch, contribute little, if any, water to this Spring Branch during the irrigation season.

[fol. 10] Beginning in Sections 23 and 24, Twp. 6 North, Range 35 E. W. M., there are numerous springs which supply the water during the irrigation season to this East prong Spring Branch, Ballou Spring Creek, Big Spring Branch and Grandview Creek, which form the East Little Walla Walla River in Washington.

Lewis Spring Branch rises to the west of these springs in the Southeast quarter of the Southwest quarter of Section 23, Twp. 6 North, Range 35 E. W. M., in the State of Oregon. Its waters are all diverted for irrigation during the irrigation season. The natural drainage of the lands watered from the Lewis Spring Branch is toward the Northwest. These waters come to the surface in a spring arising just across the line in the State of Washington. This spring forms the beginning of Walsh Creek in that state.

The Westerly prong of the West branch of the Crocket unites with the Ford branch at a point in Section 22, Twp. 6 North, Range 35 E. W. M., to form the West prong of the Little Walla Walla, which crosses the line into the State of Washington, where it is known as the West Little Walla Walla River. The West Little Walla Walla River empties into the main stream in Section 31, Twp. 7 North, Range 35 E. W. M., in the State of Washington, below the intake of the canal of the Gardena Project.

The Westerly prong of the West branch of the Crocket unites with the Ford branch in Section 22, Twp. 6 North, Range 35 E. W. M., to form the West prong of the Little Walla Walla. These two branches, however, furnish little, if any, water to the West prong during the irrigation season. Springs in and near the channel of the West prong constitute substantially its only supply of water during the irrigation season.

West of the center line of Sections 22 and 27, Township 6 North, Range 35 E. W. M., rises the East branch of Mud Creek and the Middle Branch of Mud Creek, which unite to [fol. 11] form Mud Creek in Washington, which flows into the Walla Walla River in Section 36, Twp. 7 North, Range 33 E. W. M.

Further west is South Mud Creek, Schwartz Spring Branch and Dry Creek, which are tributaries of Pine Creek. South Mud Creek crosses the State Line North of Section 15, Twp. 6 North, Range 34 E. W. M., and flows westerly in the State of Washington about a quarter of a mile from the State Line to Pine Creek. It is known as Little Mud Creek in the State of Washington. Pine Creek enters the main stream in Section 2, Twp. 6 North, Range 33 E. W. M., below all the diversions on the main stream involved in these proceedings. Johnson Creek, Goodman Spring Branch and Dugger Creek are spring branches in Oregon in the water shed of Pine Creek, but have no surface channel connection therewith.

Birch Creek rises in the State of Oregon and flows Northwesterly and Westerly not far from the State Line, until a short distance from the main stream, where it turns northerly, crosses the line, and enters the main stream in Section 13, Twp. 6 North, Range 35 E. W. M., in the State of Washington just North of the State Line.

Shortly after passing the line into the State of Washington, the main stream turns and flows through wide valleys in a Westerly direction a distance of approximately thirty miles, where it empties into the Columbia River, near Wallula.

The principal tributary of the main stream in the state of Washington is Mill Creek, which also rises in the Blue Mountains in the State of Oregon. None of the waters of the water shed of this tributary reaches the main stream in the State of Oregon. Approximately twelve miles above the confluence of Mill Creek with the Walla Walla River, the tributary divides, one branch forming Yellowhawk Creek. Yellowhawk Creek, in turn, divides, one branch forming Garrison Creek. The courses of Yellowhawk Creek and Garrison Creek diverge for a ways, then run nearly parallel in a Southwesterly direction to the main stream, Garrison Creek entering the main stream in the Northeast [fol. 12] quarter of the Southeast quarter of Section 4, Twp. 6 North, Range 35 E. W. M., and Yellowhawk Creek entering the same in the Northeast quarter of the Northwest quarter of Section 11, Twp. 6 North, Range 35 E. W. M. The intake of the Gardena Project is located on the main stream between the two points.

Garrison Creek has no tributaries, except a few inconsequential spring branches.

Cottonwood Creek, Russell Creek and Lasater Spring Branch are tributaries of Yellowhawk; the lower of these tributaries entering the same about one mile and a half above its mouth. Reser Creek in turn is a tributary of Russell Creek. About a mile and a half above the Yellowhawk division, Mill Creek divides, one branch being Titus Creek, which parallels and then unites with Mill Creek about a mile below the Yellowhawk division. Mill Creek runs through the city of Walla Walla and enters the main stream near the Whitman Mission, in Section 31, Twp. 7 North, Range 35 E. W. M.

At the point of the Yellowhawk division of Mill Creek, controlling works have been constructed and the waters of Mill Creek are apportioned between the two streams, in accordance with the priorities of the rights of persons entitled to water from the two streams, except rights in lower Mill Creek, below the Southeast quarter of the Southeast quarter of Section 23, Twp. 7 North, Range 35 E. W. M., which for practical purposes are administered independent of the rights on the upper portion of the stream above that point.

Stone Creek is a tributary of the main stream, entering the same below Yellowhawk in the Southwest quarter of Section 3, Twp. 6 North, Range 35 E. W. M. and below the intake of the canal of the Gardena Project. Doan Creek is a tributary of lower Mill Creek and enters the same in the Northwest quarter of the Northwest quarter of Section 32, Twp. 7 North, Range 35 E. W. M. The Touchet River is a tributary of the main stream, entering the same in Section 4, Twp. 6 North, Range 33 E. W. M. McEvoy Spring Branch enters the main stream in the Southwest quarter of [fol. 13] Section 3, Twp. 6 North, Range 35 E. W. M., above the intake of the canal of the Gardena Project. There are other spring branches entering the stream which are too inconsequential to mention specifically. Yellowhawk Creek, East Little Walla Walla River, McEvoy Spring Branch and Birch Creek are the only tributaries entering the main stream in the State of Washington above the intake of the canal of the Gardena Project.

II

It is further hereby stipulated and agreed that:

(1) As to the rights between the two states in the instant case, the rights of the City of Walla Walla to the waters of Mill Creek for municipal and other beneficial purposes shall be construed to be a right for 28 cubic feet per second of time, with a priority date of 1866.

(2) Attalia Irrigation District No. 1 has a right to the return waters of the lower Walla Walla River, with a diversion point located near the East line of Section 22, Twp. 7 North, Range 32 E. W. M. This right, under the provisions of the decree in the adjudicated case of State vs. Achermann, No. 19075, Superior Court of the State of Washington, Walla Walla County, does not run against the rights of the water users of the upper valley, and such provisions of said decree shall apply in favor of the water users in Oregon, and the rights of said district are not involved in the instant case.

(3) Touchet River, in Washington, and Goodman Spring Branch, Dugger Creek and Johnson Creek, in Oregon, are not interstate streams, and the rights to the use of the waters thereof are not involved in any issue in this case.

(4) The rights to the use of the waters of Mud Creek and its tributaries, towit, East Branch of Mud Creek and Middle Branch of Mud Creek, and of Pine Creek and its tributaries, towit, South Mud Creek (known as Little Mud in Washington), Schwartz Spring Branch and Dry Creek, together with any other tributaries of the foregoing named streams, [fols. 14 & 15] are hereby established, and shall be adminis-

tered, and the water shall be distributed to such rights, in accordance with the decrees of the courts of the two states and the permits for the appropriation of water issued by authority of the two states, in the same manner as if the State line did not exist, and there are no issues herein in respect thereto.

Dated at Walla Walla, Washington, this 21st day of October, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Atty. General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 16] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 3—STATEMENT OF FACTS

The following statement of facts is hereby stipulated and agreed upon by counsel for the respective parties, as follows:

I

Land Forms, Drainage and Climate

(Based largely on the report of A. M. Piper)

The Walla Walla Basin is part of a plateau extending from the Columbia River to the Blue Mountains. The western edge of the adjacent Blue Mountain section is about 10 miles East of the city of Walla Walla. This plateau has moderate relief, ranging from 1900 feet elevation along the flank of the Blue Mountains to 400 feet in the river bottoms at the Western edge of the area. The only extensive flat areas are the flood plains and terraces developed by the larger streams. For the most part the upland areas comprise sub-parallel ridges tending North 20 degrees East, separated by V-shaped valleys which commonly are 50 to

300 feet deep. These ridges and slopes have a deep fertile soil. The Walla Walla Valley is rudely triangular, and from apices in the canyons of Mill Creek and the Walla Walla River, converges westward to the head of the gorge [fol. 17] which begins 20 miles to the West. Near Whitman, where the Walla Walla River and Mill Creek join, the valley is ten miles wide. At Touchet it is about four miles in width. The valley comprises three distinct physiographic divisions. In order of decreasing age, these are: the Gardena terrace, whose remnants in places are as much as 120 feet above the flood plains of the river; the Low terrace, whose remnants parallel the flood plains and are commonly less than 20 feet above them; and finally the alluvial fans of the Walla Walla River and of Mill Creek and the flood plains of the river and its tributaries.

The Gardena terrace is now thoroughly dissected, and is represented by numerous remnants, which range in size from flats 18 miles in length to hillocks 100 yards across. The most prominent remnant lies south of the Walla Walla River, in the Western part of the area upon which is situated the Gardena irrigated district, from which this land form is named. This remnant in places stands 120 feet above the flood plain of the river, southeast of Touchet, and 40 feet above the flood plain of Dry Creek in Oregon, 10 miles to the East. The remnant flanks the Southern wall of the valley for a distance of 12 miles. The larger remnant of the Gardena terrace lies North of Walla Walla. In the central plain of the basin the terrace has been thoroughly dissected by the several distributaries of the Walla Walla River and Mill Creek, which have left long narrow remnants. In general the gradient of the Gardena terrace is slightly less than that of the adjacent flood plain. Remnants in the flood plain of the area are 100 to 120 feet above the flood plain, and slope westward less than 20 feet to the mile. Those in the Eastern part of the area stand only 10 to 25 feet above the fans of the Walla Walla and Mill Creek, and decline westerly 60 to 75 feet in a mile.

The Low terrace is inconspicuous and is represented by remnants less than one mile wide and as much as 8 miles long, and which border the flood plains. Remnants of the Low terrace are readily discernible in the Western part of the area, where they are 5 to 20 feet above the flood plain. [fol. 18] Upstream they become lower and less discernible and commonly merge into the flood plain without any topographical break.

The alluvial fan of the Walla Walla River slopes North from an apex at the mouth of the rock-walled canyon at Milton, and is about 4 miles long and 4 miles wide along the outer margin. At its apex the fan is about 1,070 feet above sea level. From this altitude it descends about 60 feet to the mile and stands about 850 feet above sea level at its outer margin. This feature is delimited to the North and West by the upstream ends of the several remnants of the Gardena and Low Terraces. The Walla Walla River, commonly called the Tumalum, follows its East margin. Below the fan the Walla Walla River and its several distributaries have developed flood plains which generally are less than 0.5 miles wide and which are separated or bordered by long narrow remnants of the Low terrace or by higher remnants of the Gardena terrace. The alluvial fan of Mill Creek is less prominent than the fan of the Walla Walla at Milton. This fan originates at an apex about 2 miles east of Walla Walla and is roughly relimited by Yellowhawk Creek on the South, by the main channel of Mill Creek on the North, and by several narrow remnants of the Gardena terrace on the West. The maximum width of one and a half miles is attained at Walla Walla. Both above and below the fan, the flood plain of Mill Creek averages 0.5 miles wide. The gradient of the Walla Walla River decreases progressively downstream. At the junction of the canyons of the North and South forks it is about 80 feet in a mile. Across the fan North of Milton the average slope is about 60 feet in a mile. At Whitman, in the central part of the valley, the slope is 40 feet to the mile, and further downstream, between Touchet and the head of the gorge, it becomes less than 10 feet to the mile. The Walla Walla River drains about 150 square miles above Milton, its drainage area being moderately rugged and moderately high in altitude. Little rain falls on the drainage area in the summer, and a large part [fol. 19] of the precipitation in the winter is snow. Under these conditions, the stream is subject to an annual spring freshet and is flashy throughout the year.

The gradient of Mill Creek is about 100 feet to the mile at the mouth of the canyon, 65 feet to the mile at Walla Walla, and 50 feet to the mile near Whitman, which is just above its junction with the Walla Walla River.

The Walla Walla Basin has a semi-arid climate, with warm, dry summers and cold wet winters. The mean temperature in the warmest month, which is generally July, is 73.9 deg. F. at Milton, 76.5 deg. F. at Walla Walla, and 72.8 deg. F. at Lowden. In the coldest month, which generally is January, it is 31 deg. F. at Milton, 30.9 deg. F. at Walla Walla, and 29.1 deg. F. at Lowden. The mean annual temperature is 52.6 deg. F. at Milton, 53.9 deg. F. at Walla Walla, and 51.3 deg. F. at Lowden. During the past ten years, the highest recorded temperature was 107 deg. F. and the lowest was —15 deg. F. During the same period, the latest killing frost in the spring has ranged from March 9th to May 9th, and the earliest killing frost in the autumn from September 21st to November 12th. The average growing season, or frost-free period, is 193 days. The average annual rainfall at Milton, during the 11 year period 1922-1932, was 12.99 inches, of which 1.54 inches fell during the three summer months, July, August and September. The average annual rainfall at Walla Walla during that period was 14.37 inches, of which 1.64 inches fell during the three summer months. The average annual rainfall at Lowden, during the same period, was 9.52 inches, of which 1.25 inches fell during the three summer months.

II.

Irrigation Practices.

The growing season in the Walla Walla Basin extends from April to October, inclusive. Irrigation during this growing season is called herein summer irrigation, and irrigation during any other part of the year is herein called winter irrigation. Winter irrigation is practiced on the [fol. 20] lands served by the Milton, Freewater & Hudson Bay Irrigation Company, and on some of the lands of the Gardena project. The balance of the Walla Walla Basin is served by summer irrigation. In all cases where the water supply is not sufficient to supply water during the entire growing season, the practice is to store water in the soil, where possible, by irrigation prior to the growing season and whenever water is available. In summer irrigation of orchards, alfalfa and grain, outside of the gravelly soil, the practice is to apply water about once every two weeks. In areas of gravelly land, the practice is to apply water to such crops once a week. In the gravelly soil in and around

Milton and Freewater, for strawberries, tomatoes, garden vegetables and short-rooted crops, the practice is to apply water two to three times a week. Where the application is made several times a week, the period of application is from two to four hours each time. Where it is once a week, the time of application is from eight to twelve hours. Where application is made at longer intervals, the length of time depends upon the amount of acreage, and in most cases a continuous flow to each irrigator is used. The flooding method of irrigation is not practiced. Nearly all the irrigation is by what is known as the corrugation method.

It is the general practice in the orchards to grow cover crops of clover, alfalfa and the like, as a protection against evaporation. These crops are usually chopped into the soil as fertilizer.

Controlling works are found at the principal points of diversion from the stream. Weirs for measuring undividual rights are in general use throughout the valley.

Rotation is practiced to a considerable extent. In Oregon, in the deep soils, the rotation period is from one to two weeks for alfalfa and grain. In the gravel soils, for orchards and alfalfa, the average irrigated acreage for a group of rotaters is about 60 acres, and rotation is practiced on a weekly basis. Where the gravel soil about Milton and Freewater is cultivated to strawberries, tomatoes, vegetables and short rooted crops, the average irrigated [fol. 21] acreage for a group of rotaters for such crops is from 10 to 20 acres and rotation is practiced on both a twice a week and a thrice a week basis. Rotation under the Oregon decrees may be enforced by the water master, and in some instances is carried out by agreement of the parties. In Washington, rotation is practiced under all ditches operated by irrigation districts, and in the vicinity of Walla Walla, by private arrangement between the individual water users. The period of rotation varies greatly, but averages, it is estimated, about ten days.

In some instances there is a run-off from the irrigated lands, caused by the use of a large head of water. This run-off, locally called waste water, is utilized on succeeding tracts.

In the section around Milton and Freewater, there are approximately 300 wells, which pump water from the lower gravel strata and apply it to irrigation. In Washington there is little irrigation from wells.

III.

Crop Production

Oregon.—In Oregon the crops consist of wheat, alfalfa hay, prunes, apples, cherries, tomatoes, berries, vegetables and nursery stock. In the irrigated section there are from 3000 to 4000 acres of prunes, yielding about 6 tons to the acre; from 1000 to 1800 acres of apples, yielding about 8 tons to the acre; 200 to 300 acres of cherries, yielding about 4 tons to the acre; about 200 acres of tomatoes, yielding 10 tons to the acre. (The acreage of tomatoes has been cut down this year from past years, in accordance with the general policy of cutting the amount of production. Last year the acreage was about 300 acres.) There are about 125 acres of berries, yielding about a ton to the acre. Nursery stock of about 175 acres supplies about 40 carloads per year, besides the local market. Alfalfa hay is raised on from 2000 to 2500 acres of land, and yields from 5 to 7 tons per acre, depending on the length of time that water [fol. 22] is available for irrigation. In this district there are approximately 2500 dairy cattle, exclusive of those kept for family purposes only. In the line of vegetables, squash, melons, potatoes and other varieties yield in proportion to the tomatoes. There has also developed a considerable flower trade. A number of growers specialize in peonies, supplying the trade not only with peony blooms but with the plants.

Washington.—The crops of the valley in Washington consist principally of alfalfa, wheat, vegetables and fruits. It is estimated that 40,000 tons of alfalfa are raised in this area annually. The average acreage yield is 6 tons. Wheat on irrigated land is generally raised as part of the rotation between alfalfa plantings. It is estimated that 1000 acres of wheat are irrigated in this area annually. The average acreage yield is 50 bushels. Crops of vegetables are grown quite extensively. The average annual yield of the following varieties is: Head lettuce, 49 cars; cabbage, 16 cars; rhubarb, 35 cars; onions, 300 cars; spinach, 100 cars; tomatoes, 30 cars; cantaloupes, 46 cars; potatoes, 307 cars; mixed vegetables, 84 cars. The average acre yield of the following varieties is: Asparagus, 500 boxes to the acre; spinach, 500 boxes per acre; onions, 600 sacks per acre; potatoes, 200 sacks per acre. Fruits are also grown in this area. In 1932, 125 cars of apples and 302 cars of prunes were estimated to have been shipped out of Walla Walla. Apples in this territory yield from 5 to 10 boxes per tree. Prunes yield as high as 600 boxes to the acre. The sweet varieties of cherries are grown, yielding as high as 100 pounds to the tree. It is estimated that 145 tons of cherries were raised in 1929. Peaches and pears are grown successfully, principally fo the local market. 16 tons of peaches were raised in 1929. An average of 10 cars of grapes are shipped from Walla Walla annually. Strawberries yield as high as 600 crates to the acre. Approximately 100 acres in this area are devoted to berry culture. It is estimated that there are 4000 milk cows on the farms in this area. Two and three-quarter million gallons of milk were pro- [fol. 23] produced in 1929. Poultry is also raised extensively. 7500 turkeys, 1600 ducks and 1000 geese were estimated to have been raised in this area in 1929. $47,000.00 was also realized from the sale of chickens in that year.

IV

Development of Community

Oregon.—The Oregon community supports a flour mill, a sawmill and box factory, cider works, a dehydrating plant and a vinegar plant, in addition to a number of commission houses and fruit and vegetable distributors. In order to handle the fruit and vegetable crops, five cold storage houses have been erected and are operated by the various companies.

The district contains ten grade schools, having a total of about 1000 pupils, and a splendid Union High School. There are about ten churches. This property, together with the municipal buildings of the two towns, represents a value of about half a million dollars.

Washington.—In the city of Walla Walla there are 66 manufacturing plants, including four flour and feed mills, a meat packing house, a cannery, specializing in vegetable canning, three creameries, an iron products foundry, two sash and door factories, a concrete pipe and conduit plant, and other small manufacturing enterprises. The annual value of the products of these industries is $6,279,166.00.

The city of Walla Walla supports a high school, six grade schools, three parochial schools, three music schools and two colleges, with an aggregate average annual attendance of 5300 students. There are twenty-four churches, representing all principal denominations, four theatres and three hospitals. Grade schools and churches exist and are well distributed outside the city in this area.

[fol. 24]

V

Population, Farm Acreage and Assessed Valuation

The territory herein considered excludes all that part of the river basin which by stipulation has been heretofore removed from any issue in the case.

Oregon.—The related territory in Oregon, excluding the Hudson Bay lands, has a population, according to the 1930 census, of 4772, of which 2308 is urban, being the cities of Milton and Freewater, and 2464 is rural. In addition, the Hudson Bay lands are occupied by about 65 families, which would raise the total population of the district to about 5000.

The irrigated lands are farmed intensively. The 6233.87 acres irrigated from the Walla Walla River, spring branches and East Prong of the Walla Walla, are divided into 889 farms, with an average acreage of 7.01 acres. The West Prong and Lewis Spring Branch have 618.74 acres, divided into 36 farms with an average acreage of 17.19. The Pleasantview Ditch Company irrigates 1249.18 acres, divided into 62 farms with an average acreage of 20.15. The Milton, Freewater & Hudson Bay Irrigation Company irrigates 2675.41 acres, divided into 57 farms, with an average acreage of 47 acres. This makes a total acreage in the related area of 10,777.20, divided into 1044 farms, or an average acreage of 10.32 acres.

This acreage has an assessed valuation, on the 1932 roll, exclusive of the Hudson Bay acreage, of $1,543,120.00. The Beauchamp land, of 86.67 acres, irrigated under the Hudson Bay, is assessed at $11,810.00, and the Markham land, 200 acres, is assessed at $21,560.00. Based upon these assessments, it is estimated that the assessed value of the Hudson Bay lands is substantially $250,000.00. The assessed valuation of the cities of Milton and Freewater is $915,975.00. This makes a total assessed valuation of the related district of $2,709,095.00. The assessed valuation is usually counted as averaging about fifty per cent of the actual value.

[fol. 25] Washington.—The related territory in Washington, outside the incorporated towns, has a population of 7090, according to the 1930 U. S. census. The population of the city of Walla Walla, according to the same authority, is 15,976. There are 9615 acres of irrigated land in the vicinity of Walla Walla. The size of the farming units in this area varies from 1 to 500 acres. The average is 17 acres. In the vicinity of Lowden there are 3231 acres, ranging in size of unit from 2 to 160 acres, with an average of 38 acres. In the Gardena district, the smallest unit is 4 acres, the largest 200 acres, and the average 70 acres.

The above described acreage in the vicinity of Walla Walla has an aggregate assessed valuation, on the 1932 tax roll, of general taxes, of $3,845,942.00. The assessed valuation of lands in the city of Walla Walla for the same year is $8,137,409.00. In the vicinity of Lowden, lands were assessed for the same year at $225,670.00, and in the Gardena District, at $234,663.00. The total aggregate assessed valuation of the land in the related area is $12,443,684.00. Under the law in the State of Washington, lands are assessed for taxation purposes at fifty per cent of their actual value.

[fol. 26] Priorities and Approximate Acreages, As Shown By Decrees and Permits

The following tabulation shows the approximate acreage under each year's date of priority, as shown by the several decrees of the two states, for the related area, excluding all that part of the river basin which by stipulation has been heretofore removed from any issue in the case, and including the Gardena appropriation, the priority of which is contested by Oregon and reserved for further hearing.

	Oregon			Washington		
Year	Walla Walla River	Waste	West Pg. in Oregon	Walla Walla River	Tributaries	West Pg. (Little W. W. R.)
1859	......	......	......	....	37.15	......
1861	......	......	......	....	314.00	......
1862	35.84	......	......	....	....	......
1863	......	......	......	....	83.50	......
1864	38.22	......	......	....	81.61	......
1865	37.12	......	......	....	124.23	......
1866	3.30	......	......	....	137.13	......
1867	8.24	......	......	....	....	......
1868	60.28	......	......	....	89.90	......
1869	4.18	......	......	....	44.45	......
1870	47.31	......	......	160.00	85.83	......
1871	11.06	......	......	....	....	35.00
1872	55.78	......	......	....	79.75	......
1873	65.50	......	......	....	13.00	......
1874	25.26	......	......	....	....	......
1875	291.47	......	......	....	20.40	......
1876	72.90	15.00	......	....	1.32	......
1877	87.73	......	......	....	12.00	......
1878	81.74	......	......	....	54.77	......
1879	31.55	......	......	....	....	......
1880	180.17	......	43.80	....	25.20	......
1881	123.46	......	7.50	....	51.50	......
1882	86.90	......	......	....	91.00	......
1883	55.09	......	13.00	....	61.73	......
1884	16.50	......	......	125.00	149.48	......
1885	135.35	......	14.00	....	94.88	......
1886	54.51	......	32.00	....	141.35	20.00
1887	217.76	......	......	....	30.50	......
1888	93.38	......	......	....	....	......
1889	65.86	......	......	....	98.91	462.90
1890	113.72	10.00	60.29	....	48.50	......
1891	131.49	......	......	....	178.67	29.00

Year	Oregon			Washington		
	Walla Walla River	Waste	West Pg. in Oregon	Walla Walla River	Tributaries	West Pg. (Little W. W. R.)
1892	264.05	10.00	15.00	8,221.11	647.63	......
1893	157.54	......	9.75	431.96	18.00	......
1894	102.12	......	82.00	....	477.97	187.70

[fols. 27 & 28]

Year	Oregon			Washington		
	Walla Walla River	Waste	West Pg. in Oregon	Walla Walla River	Tributaries	West Pg. (Little W. W. R.)
1895	242.07	......	75.50	....	246.75	......
1896	30.72	......	......	180.79	....	65.00
1897	128.31	......	10.50	....	141.25	......
1898	44.37	......	9.50	....	160.00	......
1899	7.06	......	......	....	6.50	......
1900	198.99	......	50.00	....	99.33	......
1901	87.69	49.90	11.00	....	105.45	1.00
1902	165.90	33.90	72.00	....	38.00	52.00
1903	2,725.04	15.30	7.50	40.00	147.06	......
1904	23.02	8.70	14.50	330.00	884.58	......
1905	136.35	12.80	......	....	25.05	10.00
1906	40.06	......	16.00	....	123.75	......
1907	80.99	8.75	7.00	50.00	153.15	......
1908	193.82	38.84	16.70	....	202.55	106.00
1909	316.71	......	......	....	42.00	......
1910	33.25	......	......	....	32.28	......
1911	......	......	......	....	50.00	......
1912	962.14	......	......	15.00	371.00	......
1913	392.25	......	......	....	83.19	......
1914	14.00	......	......	....	136.50	......
1915	97.00	......	......	....	63.10	......
1916	28.80	......	......	....	0.40	33.00
1917	59.00	......	......	....	63.28	21.00
1918	28.00	8.00	......	....	49.90	......
1919	59.00	......	9.25	5.00	29.00	35.00

1920	27.50	15.00	32.00	50.00	61.74	32.00
1921	12.00	......	......	....	75.52	......
1922	140.00	113.00	......	....	3.60	......
1923	140.00	37.00	......	....	11.00	......
1924	91.00	5.00	......	35.00	6.00	......
1925	41.00	25.00	......	....	0.50	......
1926	3.50	......	10.00	880.00	1,419.80	49.00
1927	90.40	......	......	15.00	....	......
1928	281.15	......	......	....	25.00	......
1929	30.00	......	......	....	7.50	......
1930	44.80	......	......	....	....	......
1931	1.00	......	......	....	....	......

Dated at Walla Walla, Washington, this 10th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Assistant Attorney General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

[fol. 29] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 4—RELATING TO CERTAIN EVIDENCE

It is hereby stipulated by and between the undersigned counsel for the respective states:

I. That the simplified soil map prepared by Mr. Youngs of the U. S. G. S., with reference to susceptibility to irrigation, showing the areas of the different classes of soils, is hereby adopted as being a correct representation of the classifications and of the areas of the several classes of soil, and that the symbols indicated thereon shall have the meaning as shown by the key attached to said map, and that said map and key shall be identified by the signature of an attorney representing each of the parties hereto, and that thereafter said map and key so identified shall be filed with the Special Master in this case and may be introduced in evidence without further identification.

II. That the report of A. M. Piper, T. W. Robinson and H. E. Thomas, of the U. S. G. S., upon their study of the ground water of the Walla Walla Basin, Oregon and Washington, with appendices, released October 30th, 1933, or any part of the same, may be introduced in evidence by either party hereto without further identification.

[fols. 30-31] III. That the general map of the Walla Walla Basin, heretofore filed, approved by C. E. Stricklin, State Engineer of the State of Oregon, and Chas. J. Bartholet, Supervisor of Hydraulics of the State of Washington, is hereby adopted as the official map, and may be introduced in evidence without further identification.

IV. That the statutes and constitution of either the State of Oregon or the State of Washington may be submitted in evidence or in argument by reference to the official codes and session laws of the respective states; that the court decisions of either state may be cited by counsel in support of the points contended for, by reference to the state reports and accepted publications of the decisions of the Supreme Courts of the respective states.

Dated at Walla Walla, Washington, this 10th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Assistant Attorney General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

[fol. 32] In Supreme Court of the United States

[Title omitted]

Stipulation No. 5—Statement of Agreed Facts

The largest diversion from the Walla Walla River in the
The following facts are hereby stipulated and agreed:
State of Washington is for lands served by the Gardena Farms District Canal, formerly Walla Walla Irrigation Company Canal. At a point approximately twelve and a half miles West of the diversion point and in the SW¼ of the NW¼ of Section 5, Twp. 6 North Range 34 E. W. M., the canal enters a syphon, through which it crosses Pine Creek Valley and emerges therefrom in the NE¼ of the SE¼ of Section 12, Twp. 6 Range 33 E. W. M.

By decree in the Superior Court of the State of Washington for the County of Walla Walla, in the case of State of Washington, plaintiff, vs. Charles Achermann et als., defendants, No. 19075, the Walla Walla Irrigation Company, under Proof No. 570, was given a right from the Walla

Walla River, by appropriation under a priority date of [fol. 33] 1892, to irrigate 7000 acres of land with a maximum amount of water of 93.333 c. f. s. from April 1st to July 1st, and 70 c. f. s. of water from July 1st to October 1st, subject to the following note:

That claimant's 5,000 acres of land, which was the amount irrigated at the time of the hearing of the claim of said Walla Walla Irrigation Company before the referee, to-wit, on the 29th day of March, 1926, is entitled to use of water to the extent of 66.67 cu. ft. per second from April 1st to July 1st; 50 cu. ft. per second from July 1st to October 1st, and 1 cu. ft. per second for each 50 acres of land for winter irrigation; provided, that from and after said 29th day of March, 1926, the remaining lands susceptible to irrigation which may in the future be developed, shall be entitled to a quantity of water for irrigation at the rate herein allotted, as said lands may be brought into cultivation from time to time until a maximum of 7,000 acres are developed and the maximum of water herein awarded is used; and that the amount of land to which this claimant is entitled to water under the above provision shall be determined at the beginning of the spring irrigation season each year, by the State Supervisor of Hydraulics.

A certificate of water right issued under said decree is hereto attached, made a part hereof and marked Exhibit "A".

In the year 1928, an irrigation district was formed, known as the Gardena Farms District, which acquired the rights of the Walla Walla Irrigation Company.

In the beginning, J. F. Boyer, T. J. Kirk and W. F. Courtnay caused preliminary surveys to be made and a canal route to be located. Several notices of appropriation were posted at the proposed point of diversion and recorded in the office of the proper recording officer of Walla Walla County, State of Washington, copies of which, with dates of record, are hereto attached, made a part hereof and marked Exhibit "B", "C" and "D" for diversion from the Walla Walla River, and Exhibit "E" for diversion from the Little Walla Walla River. No diversion was ever made from the Little Walla Walla River.

[fol. 34] In th spring of 1892, E. C. Burlingame, a contractor, became interested in the project and made further surveys and investigations of the route of the canal, and thereafter acquired an interest therein.

Soon thereafter in the same year a corporation was formed, known as the Walla Walla Irrigation Company. On November 5, 1892, formal conveyances of the rights of the individual appropriators were made to the Company, by deed recorded January 24, 1893, in Book 53, at page 179, Deed Records of Walla Walla County, Washington.

Mr. Burlingame performed the construction work for the Company using his own equipment and teams up to the time of the formation of the irrigation district which succeeded to the rights of the company in 1928.

In August 1892 actual construction work on the canal was begun.

Prior to the year 1905 the canal was constructed from the diversion point in the McBean donation land claim in the SW¼ SW¼ Section 3, Twp. 6 North Range 35 E. W. M. along the route of the canal as shown on the official map herein, to a point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. where the map indicates that the canal divides. From said divisional point one division of the canal was constructed in a Southwesterly direction into the State of Oregon, and also from said divisional point, prior to the year 1905, one division was constructed in a Northwesterly direction along the route indicated on the map to a point in Section 5, Twp. 6 North Range 34 E. W. M. about a mile from the upper end of the syphon.

[fol. 35] In the winter and spring of the year 1905 an inverted syphon was constructed from a point in the SW¼ of the NW¼ of said Section 5, to a point in the NE¼ SE¼ of Section 12, Twp. 6 North Range 33 E. W. M. from which point the distribution system for the irrigation of the lands West and South of the syphon was constructed and has been extended as the demands of irrigation required. This syphon has a head of 145 feet, carries the water of the canal across the valley of Pine Creek a mile and a half in width, and is built of wood staves and steel bands. It was originally of a diameter of 38 inches and has since been replaced by Gardena Farms District by one 44 inches in diameter.

For the first three miles of the course of the canal from the river the soil conditions presented no serious difficulties in construction. From there to the head of the syphon the course of the canal was in light and ashy soil requiring the canal to be puddled and causing some breaks and slides. The excavation and filling was done with teams and scrapers.

As a part of this construction work there were cuts two of which were approximately 26 feet in depth at their deepest point, one about 1500 feet and the other about 1000 feet, in length. Some fills also had to be made. The canal was constructed 16 feet on the bottom from the diversion point to the division of the canal at the point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. and from that point to the head of the syphon is now 10 feet on the bottom, all with side slopes of 1½ to 1 and with a depth of about 6 feet. The canal has a fall of .5 of a foot to a 1000 feet and a capacity of 150 c. f. s. in that portion with 16 foot bottom.

[fol. 36] The structures now on the canal from the intake to the main line syphon are as follows:

Concrete diversion dam.

Concrete head gates.

18 foot cippoletti wier at head of canal constructed of cedar lumber.

Six flumes constructed of cedar and fir lumber.

Five drops—four constructed of concrete and one of fir lumber.

Two check wiers—one constructed of concrete and one of cedar lumber.

27 bridges—one of concrete and remainder of fir timber.

Pine Creek waste way and regulating wier, constructed of concrete.

15 turn-out gates of wood and concrete.

15 cippoletti wiers at turn-out gates.

And from the main line syphon to the end of the system the structures are:

Main line syphon, one and one-half miles in length, diameter 44 inches inside, constructed of creosoted Douglas Fir wood staves and steel bands, having concrete intake and outlet works.

And in Gardena all the usual project structures, consisting of drops, bridges, turn-out gates, cippoletti wiers, check wiers and secondary syphons.

Such records of the Company as are available indicate that the following expenditures were made for construction purposes, to-wit:

[fol. 37] 1891 there was expended the sum of	$868.60
1892 there was expended the sum of	5587.59
1893 there was expended the sum of	5144.20
1894 there was expended the sum of	8210.14
1895 there was expended the sum of	2793.07
1896 there was expended the sum of	1161.19
1897 there was expended the sum of	1575.31
1898 there was expended the sum of	1712.78
1899 there was expended the sum of	1744.75
1900 there was expended the sum of	3905.77
1901 there was expended the sum of	526.74
1902 there was expended the sum of	1638.55
1903 there was expended the sum of	17477.59
1904 there was expended the sum of	1388.60
1905 there was expended the sum of	44212.36
1906 there was expended the sum of	13828.65
1907 there was expended the sum of	8203.32
1908 there was expended the sum of	15635.52
1909 there was expended the sum of	24466.59
1910 there was expended the sum of	41709.46
1911 there was expended the sum of	14892.42
1912 there was expended the sum of	152.55
1913 there was expended the sum of	140.00
1914 and	
1915 there was expended the sum of	252.95
1917 there was expended the sum of	1300.38
1920 there was expended the sum of	5400.30
1924 there was expended the sum of	1500.00
1925 there was expended the sum of	1649.08
Total	$227078.56

These expenditures are analyzed and segregated as shown by Exhibit "F" attached and made a part hereof. These payments by the Company were made as and when it had the money and do not necessarily represent the dates when the work was performed.

Such records of the Company as are now available do not segregate the cost of construction of the canal which began in the year 1900 and which was constructed from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon.

In the year 1910 the Company entered into arrangements to receive sewage water from the City of Walla Walla [fol. 38] and during the years 1910, 1911 and 1912 expended $49,253.92 for concrete sewer pipe, $3954.02 for construction work, $1471.64 for engineering, and $1771.60 for rights of way, for the purpose of conveying such sewage water to the Company's canals. This water was used until the year 1924 when such use was discontinued and the works abandoned, with the exception of a small part of the concrete pipe used for a spillway from the canal. From about 1920 to 1924 the Company contracts for the sale of water contained the following clause: "It is understood that sewage water from the City of Walla Walla is part of said water supply."

In the year 1907 the Company expended $798.00 in investigation of reservoir sites. No reservoir has been secured. The Company also expended for the drilling of wells, the following sums: In 1905, $240.50; in 1909 $6155.50; and from 1910 to 1913 the sum of $441.25, and in 1924 and 1925 the sum of $3149.08, making a total of $9980.33 expended for work in an attempt to develop an additional water supply from wells, which was without result.

Water was first diverted from the river into the canal in the year 1893 for puddling purposes and turned out through the spillway into the West Little Walla Walla River. In the year 1898 water was first used for irrigation when 68 acres along the line of the canal were irrigated. In 1899, 20 additional acres were irrigated but these latter mentioned lands have since been abandoned. In 1901, 280 acres were irrigated in Oregon from the canal running from the divisional point in Lot 3 of Fractional Section 13, Twp. 6 North Range 34 E. W. M. into Oregon, and between 1901 and 1918, 72 additional acres in Oregon were irrigated from [fol. 39] the canal, but the irrigation of these lands was discontinued in 1919, when the Company abandoned the operation of this canal. These lands are now irrigated from the Milton-Freewater and Hudson Bay ditch. In 1898, 68 acres were watered from the canal; in 1899 20 acres additional were watered in Washington, which were later abandoned.

In 1904, 193 acres were watered from the canal in Washington, including the 20 acres above mentioned as later abandoned. Approximately 1133.4 acres East of the syphon in Washington are now irrigated from the canal. The balance of the lands irrigated from the canal lie West and South of the syphon. Water was first ran through the syphon in 1905 and used for irrigation.

The following tabulation shows water contracts for irrigation, according to years sold by the Company up to 1930:

[fol. 40] Gardena Irrigation Company Rights Sold

		Year 1898	
Locher		18-6-35	68.00 Acres
		Year 1899	
Benson		....	20.00 Acres (Abandoned in 1918)
		Year 1901	
Burlingame		24-6-34	280.00 Acres (Abandoned in 1918)
		Year 1904	
Murray		6-6-34	4.00 acres
J. Merry		7-6-34	33.00 acres
Schaeffer		5-6-34	68.00 acres
		Year 1905	
White	Lot	36	8.95
Elliott	"	37	13.32
Scudder	"	38	11.72
Scudder	"	40	11.48
Scudder	"	41	7.22
Scudder	"	42	8.43
Stone	"	43	13.87
Stone	"	44	7.64
Stone	"	45	4.66
Stone	"	46	10.14
James	"	47	14.17
Harmon	"	50	23.58
Pribble	"	51	15.81
Munroe	"	52	9.74
Morrison	"	53	13.52
Stone	"	54	7.58
Stone	"	55	8.98
Elliott	"	56	14.29
Jones	"	57	9.70
Hendricks	"	58	3.74
Randall	"	59	6.49
Hendricks	"	60	4.19
Elliott	"	61	5.19
Elliott	"	62	5.45
Elliott	"	63	9.25
Macumber	"	64	6.95
Billups	"	65	10.07
Billups	"	66	7.27
Macumber	"	67	4.84
Macumber	"	68	7.85
Macumber	"	69	8.93
Elliott	"	70	12.60
Paul	"	71	10.89
Leach	"	72	10.85
Brooks	"	73	12.42
Woeffler	"	74	6.45
Anderson	"	75	8.22

[fol. 41] **Gardena Irrigation Company Rights Sold**

Year 1905

Name	Description		No. Acres
Carter	Lot	78	10.32
Benner	"	79	5.20
Whitehouse	"	80	14.65
Cox	N½	81	5.39
Cox	S½	81	5.40
Bean		82	9.49
Riggs	N½	83	5.32
Brower	S½	83	7.21
Stone		84	7.71
Riggs		85	14.28
Horton		86	15.95
Owens		89	14.49
Riggs		90	17.04
Elliott		92	12.76
Thompson		93	8.92
Critchfield		96	10.83
Wegge		97	7.82
Prindle		99	12.85
Prindle		100	9.37
Roberts		102	8.28
Ring		105	26.41
Provins		108	7.23
Watson		112	10.42
Algin		113	8.08
Snyder		114	1.86
Smith		131	4.48
Marshall		132	5.40
Harris		133	6.32
Reynolds		134	6.01
W. W. I. Co.		135	9.23
W. W. I. Co.	Pt.	136	11.63
W. W. I. Co.	Pt.	136	1.92
Olsen		138	10.92
Larsen		139	11.78
Wisenbach		145	6.27
McAnulty		146	14.88
McAnulty		147	16.52
Denton		148	10.48
McAnulty		149	7.51
Snyder		150	7.26
Douthat		151	9.72
Blackburn		152	9.70
Neal		153	9.40
Switzer		154	9.70
McCarroll		200	9.40
McCarroll		201	9.40
Waite		202	9.40
Bursell		203	9.98
Schraider		204	9.85
Waite		205	9.40
McCarroll		206	9.40
McCarroll		207	9.40
Wood		248	9.40
Kressig		250	5.25
Stone		[illegible] & 13	3.75
Burlingame	SE¼ 12-6-33 Wash.		150.00
Schaeffer			5.00

[fol. 42]

Gardena Irrigation Company Rights Sold

Year 1906

Name	Description		No. Acres
Stone	Tract	48	5.91
Stone	"	49	9.25
Randall	"	101	7.44
Morrison	"	103	14.50
Shelton	"	137	17.14
Bolick	"	140	10.43
Bolick	"	141	13.54
Burke	"	155	8.87
Brown	"	156	11.65
Thomas	"	160	6.11
Kohler	"	161	8.58
Cunningham	"	162	11.63
Cunningham	"	208	9.24
W. W. I. Co	"	209	8.99
Knauff	"	210	5.10
Johnson	"	211	8.47
Crouch	"	212	7.53
Doege	"	225	12.10
Albin	"	230	4.61
Lansdale	"	235	7.56
Dewey	"	236	4.88
Lansdale	"	237	6.56
Albin	"	241	9.40
Clothier	"	242	11.83
Wood	"	246	6.39
Clothier	"	247	9.70
Minion	"	249	8.98
Sibley	"	252	6.25
Gaiser	"	260	11.69
Heiskell	"	261	9.53
Van Horn	"	262	11.93
Palmer	"	263	5.62
Janosky	N½	264	5.47
Janosky	S½	264	4.72
Nordheim		265	9.12
Nordheim		266	9.64
Hancock		267	4.45
Maxin		268	4.62
McKinsay		269	9.58
Shuman		270	10.56
Broxson		271	9.50
Sargent		272	9.60
Irving		295	11.39
Bald		308	7.57
Shuman		309	8.77
Laabs		313	9.92
Laabs		316	7.08
Dunlap	Sec. 14–6–33 Wash.		25.00
W. W. I. Co	Sec. 13–6–33 Wash.		50.00

[fol. 43]

Gardena Irrigation Company Rights Sold

Name	Description	No. Acres
	Year 1907	
Watson	Tract 111	8.22
W. W. I. Co.	Tract 215	8.20
Riggs	276	11.69
Dresser	278	8.84
Janosky	283	5.47
Riggs	286	9.14
Riggs	288	8.84
Riggs	289	8.49
Riggs	292	8.19
Riggs	293	8.12
Zoellner	317	13.85
W. W. I. Co.	13–6–33 Wash.	30.00
	Year 1908	
Simmons	142	9.88
Albin	143	8.07
Burlingame	290	8.34
Burlingame	291	9.69
F. A. Moore	294	9.88
Moore	306	14.22
Moore	307	11.98
Moore	310	12.50
Moore	311	10.46
Moore	312	10.69
W. W. I. Co.	Sec. 13–6–33 Wash.	30.00
	Year 1909	
McDonald	31	2.97
Le Pome	322	3.24
W. W. I. Co.	323	4.10
W. W. I. Co.	324	8.10
W. W. I. Co.	328	6.10
W. W. I. Co.	329	4.69
W. W. I. Co.	331	8.10
Le Pome	334	10.39
Le Pome	338	8.36
W. W. I. Co.	339	8.39
W. W. I. Co.	340	5.80
W. W. I. Co.	341	3.66
W. W. I. Co.	345	4.00
W. W. I. Co.	346	7.77
W. W. I. Co.	347	6.80
Le Pome	350	7.27
Le Pome	351	3.22
W. W. I. Co.	352	7.99
Roberts	385	3.82
Roberts	394	3.40
Roberts	395	3.83

[fol. 44]

Gardena Irrigation Company Rights Sold

Year 1909 (Continued)

Name	Description	No. of Acres
Burlingame	417	1.04
W. W. I. Co.	418	.73
Roberts	431	2.89
Roberts	432	.03
Roe	451	7.61
W. W. I. Co.	13-6-33 Wash.	36.16
Roberta	401	3.02
Roberta	402	3.90
Roberta	403	3.69
Roberta	404	7.25
Roberta	405	9.77
Roberta	430	.65
	Year 1910	
Cohen	26	2.58
Cohen	27	2.81
Cohen	28	2.28
Cohen	29	3.21
Riorden	30	1.60
Thurber	87	13.24
W. W. I. Co.	172	6.30
W. W. I. Co.	173	6.40
W. W. I. Co.	174	7.04
W. W. I. Co.	175	7.08
Reed	325	2.86
Buck	326	4.68
McGowin	327	5.70
McGowin	332	4.89
Buck	333	5.32
McGowin	342	5.01
Reed	415	2.33
Titus	441	2.68
Adams	442	5.53
Adams	443	5.32
Rollo	444	5.27
Rollo	445	5.39
W. W. I. Co.	446	6.34
W. W. I. Co.	447	4.43
Stone	Blk. 13	.30
Stone	Blk. 15	1.21
W. W. I. Co.	13-6-33 Wash.	40.00
Burlingame	7-6-34 Wash.	10.00
W. W. I. Co.	Tract 408	6.73
W. W. I. Co.	“ 413	5.77
W. W. I. Co.	“ 414	2.21
W. W. I. Co.	“ 428	1.75
	Year 1911	
Wanstall	Lot 32	2.81
Wanstall	“ 33	2.58
Wanstall	“ 34	2.44
Wanstall	“ 35	2.61
W. W. I. Co.	“ 164	2.55
W. W. I. Co.	“ 221	1.53
Stone	“ 448	8.23
Carlton	“ 409	6.29

[fol. 45]

Gardena Irrigation Company Rights Sold

Year 1912

Name	Description	No. Acres
Hughes	Lot 88	13.30
W. W. I. Co.	Lot 176	14.10
W. W. I. Co.	Lot 177	6.50
W. W. I. Co.	Lot 178	10.93
W. W. I. Co.	Lot 182	3.79
W. W. I. Co.	Lot 183	10.12
W. W. I. Co.	Lot 186	11.72
W. W. I. Co.	Lot 187	2.08
W. W. I. Co.	Lot 238	6.73
W. W. I. Co.	Lot 239	10.12
W. W. I. Co.	Lot 319	4.99
W. W. I. Co.	Lot 320	5.07
W. W. I. Co.	Lot 321	5.02
W. W. I. Co.	Lot 335	7.18
W. W. I. Co.	" 336	6.11
W. W. I. Co.	" 337	4.49
Shaw	" 379	6.63
Shaw	" 380	4.93
Shaw	" 381	7.16
Shaw	" 382	5.81
Shaw	" 383	4.82
Shaw	" 384	4.60
Shaw	" 396	6.32
Shaw	" 397	6.81
Shaw	" 398	3.10
W. W. I. Co.	" 429	.96
Shaw	" 399	2.51
W. W. I. Co.	" 400	4.35
W. W. I. Co.	Sec. 15-6-33	15.00

Year 1914

Name	Description	No. Acres	
Simmons	Lot 144	6.78	
Gibbson	Lot 416	1.75	
Dickinson	11-6-33 Wash.	35.00	
F. H. Munns	17-6-33	10.00	
Sullivan	9-6-34	20.00	
Johnson	9-6-34	10.00	
Witherite	....	60.00	(Abandoned in 1918)
Weatherman	....	12.00	(Abandoned in 1918)
W. W. I. Co.	15-6-33	15.00	

Year 1915

Name	Description	No. Acres
W. W. I. Co.	Pt. 123	9.58
W. W. I. Co.	Pt. 130	8.28
Moore	Lot 297	19.99
Moore	" 298	8.17
Moore	" 299	12.74
Moore	" 300	5.22
Moore	" 301	3.34
Moore	" 302	3.89
Moore	" 303	6.48
Moore	" 304	7.39
Moore	" 305	10.08
W. W. I. Co.	16-6-33	45.00
E. C. Burlingame	17-6-33	90.00
Burlingame	10-6-34	56.96
Burlingame	11-6-34	50.00

[fol. 46]

Gardena Irrigation Company Rights Sold

Year 1916

Name	Description	No. of Acres
Burlingame	16–6–33	60.00
Burlingame	11–6–34	10.00
Burlingame	Sec. 18–6–34	25.00
W. W. I. Co.	14–6–33	26.00

Year 1917

Name	Description	No. of Acres
W. W. I. Co.	Lot 166	13.90
Paine Brothers	Lot 273	6.49
Paine Brothers	Lot 274	4.89
Paine Brothers	" 275	15.38
Paine Brothers	" 277	8.97
Burlingame	18–6–34	40.00
Burlingame	16–6–33	44.76
Burlingame	10–6–34	25.00
Burlingame	11–6–34	15.00
Burlingame	18–6–34	20.00
W. W. I. Co.	15–6–33	29.80
W. W. I. Co.	15 & 16–6–33	14.09

Year 1918

Name	Description	No. of Acres
Day	Lot 104	15.95
Riggs	Pt. 157	2.04
W. W. I. Co.	Lot 213	3.37
W. W. I. Co.	Lot 214	9.63
W. W. I. Co.	Lot 231	7.52
W. W. I. Co.	Lot 232	7.24
W. W. I. Co.	Lot 233	7.61
W. W. I. Co. & Gray	Lot 240	4.58
W. W. I. Co.	Lot 243	7.46
W. W. I. Co.	Lot 244	9.40
W. W. I. Co.	Lot 245	11.75
Paine Bros	Lot 285	11.01
Paine Bros	Lot 287	13.18
Paine Bros	Lot 314	11.28

[fol. 47]

Name	Description	No. of Acres
Paine Bros	Lot 315	8.26
Paine Bros	Lot 318	13.21
W. W. I. Co.	Lot 345	5.68
W. W. I. Co.	Lot 372	5.37
Dickinson	11–6–33	25.00
Burlingame	10–6–34	25.00
Burlingame	11–6–34	10.00
Burlingame	18–6–34	13.00
W. W. I. Co.	13–6–33	65.00
W. W. I. Co.	14–6–33	19.24
W. W. I. Co.	14 & 15–6–33	50.00

Year 1919

Name	Description	No. of Acres
W. W. I. Co.	Lot 355	4.13
W. W. I. Co.	Lot 356	7.41
W. W. I. Co.	Lot 362	7.69
W. W. I. Co.	Lot 419	3.43
Burlingame	7–6–34	18.00
F. H. Munns	17–6–33	7.74
Mang	3–6–34	35.43
Mang	3–6–34	29.58
Rohn	4–6–34	54.00
Rohn	4–6–34	28.50
Rohn	5–6–34	29.53

Gardena Irrigation Company Rights Sold

Year 1919 (Continued)

Name	Description	No. Acres
Moore	6–6–34	161.57
Burlingame	11–6–34	15.00
Rohn	33–7–34	2.97
W. W. I. Co.	13–6–33	70.00

Year 1920

Grandy	Lot 76	13.24
Watson	Lot 94	15.58
Watson	Lot 98	14.61
Inman	Lot 109	9.91
Inman	Lot 110	12.52
Montgomery	Pt. 251	4.50
Montgomery	Pt. 253	8.15
Montgomery	Pt. 255	2.50
Montgomery	Pt. 257	2.00
Montgomery	Pt. 259	.50
Ownby	Lot 449	5.98
Ownby	Lot 450	5.08
Paine Bros	Sec 5–6–33	71.50
Paine Bros	Sec 6–6–33	14.33
Paine Bros	Sec 7–6–33	90.00
Craig	4–6–34	58.80
Schaeffer	5–6–34	15.00
Burlingame	18–6–34	5.00
W. W. I. Co.	13 & 14–6–33	60.00

[fol. 48]

Year 1921

Rector	Lot 91	7.98
Paine Bros	279	10.98
Paine Bros	280	8.10
Paine Bros	281	7.48
Paine Bros	282	7.42
Paine Bros	284	7.31
W. W. I. Co.	348	5.74
W. W. I. Co.	349	5.73
W. W. I. Co.	Lot 358	7.28
Schaeffer	5–6–34	34.00
Burlingame	9–6–34	80.00
Burlingame	18–6–34	5.00
W. W. I. Co.	13–6–33	40.00

Year 1923

Burlingame	9–6–34	20.00
Burlingame	13–6–13?	10.00
Burlingame	18–6–34	22.92
W. W. I. Co.	13 & 24–6–33	40.00
W. W. I. Co.	13–6–33	45.00

Year 1924

Burlingame	13–6–13	20.00

Year 1925

Burlingame	9–6–34	20.00
Hellberg	14–6–34	86.00
White	15–6–34	60.00
Burlingame	13–6–13	15.00

Year 1926

Burlingame	13–6–13	10.00

Gardena Irrigation Company Rights Sold

Name	Description		Acres
	Year 1927		
Johnson	Lot	170	.25
W. W. I. Co. & Gray		240	4.00
Kellough	Lot	357	8.15
Blair	Lot	358	8.26
Burlingame	13-6-13		13.23
Johnson	Lot	77	11.34
	Year 1928		
W. W. I. Co.	Lot	171	10.00
Nelson	Lot	222	7.31
Nelson	Lot	223	6.50
Nelson	Lot	229	2.00
Nelson	Lot	234	6.16
Murray	6-6-34		6.50
[fol. 49]	Year 1929		
W. W. I. Co.	14-6-33		13.51
	Year 1930		
Thornston	Lot	106	13.18
Thornton	Lot	107	10.00
Haining	Pt.	157	10.65
Kellough	Lot	357	8.91
Kellough	Lot	360	7.94
Kellough	Lot	363	9.58
Kellough	Lot	375	7.11
Kellough	Lot	387	5.77
Kellough	Lot	388	3.92

Undeveloped Land With Water Right—Paying Maintenance Since 1928

Washington				Oregon (Through Gardena)	
Gardena	Acres		Acres		Acres
Lot 95	2.48	Lot 423	1.67	Lot 406	7.53
163	5.00	424	2.71	407	3.68
165	7.00	425	4.41	433	.19
169	4.00	426	1.36	434	1.11
216	4.69	427	1.19	436	.55
219	4.00	435	.52	438	2.23
220	2.00	437	.48	439	.16
224	4.00				
330	8.45	Total Wash.	201.11	Total Oregon	15.45
344	8.94				
361	7.63				
364	7.87				
365	6.73	Wash.	201.11		
366	5.62	Oregon	15.45		
367	7.15				
368	6.51		216.56—Total Unimproved.		
369	3.71				
370	5.52				
371	7.14				
373	8.00				
374	9.28				
376	5.69				
377	7.03				
378	7.55				
389	9.11				
390	7.63				
391	8.94				
392	6.46				
393	9.06				
420	.69				
421	.88				
422	.01				

[fol. 50] The foregoing tabulation of water contracts sold by the Company up to 1930 totals 5793.09 acres. Of this amount 372 acres were later abandoned, leaving water rights outstanding for 5421.09 acres, of which there are 201.11 acres in Washington and 15.45 acres in Oregon for which irrigation payments are being made, but which are not now being irrigated. A survey by Oregon indicates that in 1933 there was irrigated from the system 4530.2 acres in Washington and 721.3 acres in Oregon, being 46.97 acres more than the above tabulation.

The soil West of the syphon is deep and rich, and with irrigation produces abundant crops. Approximately 85 families live on the lands served by this irrigation system. West of the syphon is a church and a school employing two teachers.

Dated at Walla Walla, Washington, this 29th day of November, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 51] EXHIBIT "A" TO STIPULATION

Amended

Certificate of Water Right

This is to certify:

That by virtue of a decree of the Superior Court of the State of Washington in and for Walla Walla County, made and entered on the 12th day of September, 1928, and recorded in Volume 16 of the Superior Court Journal of said County at page 1 and Amendment thereto, dated February 26th, 1931, from which decree no appeal was taken, and which decree determined the rights of all known claimants to the use of the water of Walla Walla River, a tributary of Columbia River, Walla Walla Irrigation Company, Walla Walla, Washington is entitled to use, subject to provisions set forth in said decree, and the laws of the State of Washington, the waters of said Walla Walla River for the purpose of irrigation.

That the amount of water to which said water right is entitled is limited to the quantity which is reasonably and actually necessary for the purpose aforesaid and shall not exceed 93.333 second feet from April 1st to July 1st, 70.000 second feet from July 1st to October 1st, and 140.000 second feet from October 1st to April 1st for the irrigation of 7000.00 acres of the lands hereinafter described. If water is used during the last named period in addition to either or both of the two first named periods, the combined supply shall not exceed five acre feet per acre.

That the date of priority of said water right is 1892; that the decree aforesaid establishes said right in Class Thirty. [fol. 52] That the point of diversion of said water right is as follows:

The S. W. ¼ of the S. W. ¼ of section 3, township 6 north, range 35 E. W. M.

and cannot be changed except as provided in Section 39, Chapter 117, Session Laws of 1917.

That said water right was adjudged by said decree to be and is appurtenant to the following described real property situated in Walla Walla County, Washington, to-wit:

Here follows descriptions of lands as set out on pages 69 to 72, under claim No. 570 in case of State of Washington vs. Achermann, et al., No. 19075, in the Superior Court of the State of Washington for Walla Walla County.

This instrument is recorded in the office of the Supervisor of Hydraulics, at Olympia, Washington, in Volume 4A of Water Right Certificates at Page 406.

Witness the seal and signature of the Supervisor of Hydraulics affixed this 17th day of April, 1931.

Chas. J. Bartholet, Supervisor of Hydraulics of the State of Washington. (Seal).

Engineering Data. J. F. R. A.

[fol. 53] EXHIBIT "B" TO STIPULATION

Water Appropriation

To whom it may concern:

Notice is hereby given that we, the undersigned, John F. Boyer, T. J. Kirk and W. F. Courtnay desiring to appropriate the quantity of water hereinafter mentioned from the Walla Walla River in the County of Walla Walla, State of Washington, under and by virtue of the laws of said state do hereby appropriate and claim of the waters of said river as follows:

1. We claim and appropriate the water flowing in said Walla Walla River in said County and State to the extent of 200 cubic feet per second of time.

2. The said water is appropriated and claimed by us for irrigation purposes and manufacturing purposes.

3. The places of intended use of the water by us claimed and appropriated pursuant to this notice: All in township 7, North of Ranges 33, 34 & 35 East of the Willamette Meridian and in township 6, North Ranges 33, 34 & 35 East of the Willamette Meridian.

4. We intend to and shall divert the water by us claimed and appropriated by means of dams, ditches and flumes and the point of diversion thereof from the channel of said Walla Walla River shall be in the S. W. 1/4 of Section 30, Tp. 6, N. Range 35, E. W. M., said point being distant on the South bank of the river about 500 feet below the highway bridge across the Walla Walla River; and just above the mouth of Garrison Creek. Posted this 24 day of February, 1892.

Witnesses: A. L. Adams. R. C. Gernmell. F. J. Kirk. J. F. Boyer. W. F. Courtnay.

Filed February 24, 1892 at 3:40 P. M. Recorded in Book 1 of W. App'ns. page 21.

[fol. 54] EXHIBIT "C" TO STIPULATION

Notice of Appropriation of Water

Walla Walla, Wash., July 12, 1892.

By Walla Walla Irrigation Company, a Corporation under the laws of the State of Washington.

To all persons concerned and to the Public Generally.

Notice is hereby given: That the Walla Walla Irrigation Company has appropriated and hereby does appropriate and claim the water lying being and flowing in the Walla Walla River to the intent of 300 cubic feet of said water per second of time.

The point from which said water is to be taken or diverted is indicated and described as follows: Beginning at a point in the County road 45 feet from the North of the Newcomb Bridge as located and built by the County across the Walla Walla River on the McBean Donation Claim thence South 17° 15′ E. 560 feet; thence N. 73° 30′ E. 70 feet to the point of appropriation said point of appropriation is further described as being located in Township 6, N. R., 35, E. W. M.

The said water is appropriated for the said purpose of irrigation and domestic uses and for the development of water power.

The approximate location of said canal which said corporation proposes to construct is as follows, beginning at the initial point of appropriation as hereinbefore described by the general direction of the canal will be S'ly with variation both east and west.

The Corporation also proposes to construct storage reservoirs along the line of the proposed canal or at any other locations that are best situated to the interest of the Corporation to locate them.

[fol. 55] The land to be irrigated by the building of the proposed canal lies in the State of Washington also in the State of Oregon.

Said Corporation reserves the right to use and develop the water power of said canal as the future interests and the welfare of the community may direct.

The Walla Walla Irrigation Company, by J. F. Boyer, President. E. C. Burlingame, Secretary. (Seal.)

Walla Walla, Washington, July 12, 1892.

At a meeting of the stockholders and directors of the Walla Walla Irrigation Company held July 12, at Walla Walla, Washington, E. C. Burlingame the Secretary of the Company was duly authorized to proceed to the location as described in the notice of appropriation and empowered to file the above and foregoing notice of the appropriation of Water Rights.

The Walla Walla Irrigation Company, by J. F. Boyer, President. E. C. Burlingame, Secretary. (Seal.)

Filed, August 3, 1892 at 10 A. M. Recorded in Book 1 of Water App'ns., page 39.

[fol. 56] EXHIBIT "D" TO STIPULATION

Water Appropriation

To whom it may concern:

Notice is hereby given that the undersigned have appropriated and claimed and hereby appropriate and claim 500 cubic feet per second of time of the waters of the Walla Walla River now in said river at the place opposite where this notice is posted, lying, being and flowing; that said waters are appropriated and claimed for irrigation and manufacturing purposes; that said waters thus appropriated and claimed are to be taken from said river at the place where this notice is posted and conducted through and by means of a ditch or canal four feet in depth, twenty feet wide at the bottom and thirty feet wide at the top extending from this point by the most suitable and practicable route in a general N. W.'ly direction passing near the mouth of the Touchet River, to a point on the Columbia River near the mouth of Snake River; that all the lands contributory to said ditch or canal capable to being irrigated are to be irrigated by said appropriated and claimed waters.

Dated July 24, 1891.

J. T. Kirk. J. F. Boyer. W. F. Courtnay.

Filed, July 24, 1891 at 5 P. M. Recorded in Book 1 of Water App'ns., page 11.

[fol. 57] EXHIBIT "E" TO SPECULATION

Water Appropriation

To whom it may concern:

Note is hereby given That we the undersigned John F. Boyer, T. J. Kirk and W. F. Courtnay desire to appropriate the quantity of water hereinafter mentioned from the Little Walla Walla River in the County of Walla Walla, State of Washington, under and by virtue of the laws of said state do hereby appropriate and claim the waters of said stream as follows:

1. We claim and appropriate the waters flowing in said stream in said County and State to the amount of 100 cubic feet per second of time.

2. The said water is appropriated and claimed by us for irrigation purposes and for manufacturing purposes.

3. The places of intended use of the waters by us claimed and appropriated pursuant to this notice are in Township 7, North of ranges 33, 34 & 35, East of the Willamette Meridian and in Township 6, North of Range 33, 34 & 35 East of Willamette Meridian.

4. We intend and shall divert the water by us claimed and appropriated by means of dam, ditches and flumes; and the point of diversion from the channel of said stream — shall be in the Northwest ¼ of Sec. 9, Township 6, North Range 35, East Willamette Meridian said point being designated by a large cottonwood tree in the South bank of said stream marked by three cuttings with an axe. Posted this 24" day of February, 1892.

Witnesses: A. L. Adams. R. C. Gemmell. T. J. Kirk. J. F. Boyer. W. F. Courtnay.

Filed for record February 24th, 1892 at 3:30 P. M. Recorded at the request of J. F. Boyer. Recorded on Book 1 of Water App'ns., page 23.

W. B. Hawley, Auditor.

[fol. 58]

EXHIBIT "F" TO STIPULATION

Walla Walla Irrigation Company—Development by Years

Years	Construction	Wood Pipe	Concrete Sewer Pipe	Concrete Pipe	Reservoir	Engineering	Rights of way	Wells	Totals
1892–1893	7,727.09	....	....	....	....	1,536.80	2,336.50	....	11,600.39
1894–1895, 1896	11,812.90	....	....	....	....	50.—	301.50	....	12,164.40
Totals	19,539.99		....	....	....	1,586.80	2,638.00	....	23,764.79
1897 to 1904, Inc.	27,536.87	....	....	....	....	218.45	2,214.67	....	29,969.99
Totals	47,076.86		....	....	....	1,805.25	4,852.67	....	53,734.78
1905	27,307.47	15,218.29	....	....	....	1,361.10	85.—	240.50	44,212.36
Totals	74,384.33	15,218.29	....	....	....	3,166.35	4,937.67	240.50	97,947.14
1906	12,575.75	....	....	....	....	913.90	339.—	....	13,828.65
Totals	86,960.08	15,218.29	....	....	....	4,080.25	5,276.67	240.50	111,775.79
1907	7,405.32	....	....	....	798.—	....	....	....	8,203.32
Totals	94,365.40	15,218.29	....	....	798.—	4,080.25	5,276.67	240.50	119,979.11
1908	15,617.92	....	....	....	....	17.60	....	....	15,635.52
Totals	109,983.32	15,218.29	....	....	798.—	4,097.85	5,276.67	240.50	135,614.63
1909	16,653.39	....	....	....	....	857.70	800.—	6,155.50	24,466.59
Totals	126,636.71	15,218.29	....	....	798.—	4,955.55	6,076.67	6,396.00	160,081.22
[fol. 59]									
Forward Totals to 1909	126,636.71	15,218.29	....	....	798.—	4,955.55	6,076.67	6,396.00	160,081.22
1910	3,954.02	....	34,389.70	....	....	1,471.64	1,771.60	122.50	41,709.46
Totals	130,590.73	15,218.29	34,389.70	....	798.—	6,427.19	7,848.27	6,518.50	201,790.68
1911	....	....	14,713.67	....	....	....	....	178.75	14,892.42
Totals	130,590.73	15,218.29	49,103.37	....	798.—	6,427.19	7,848.27	6,697.25	216,683.10

1912..............	....	....	152.55	....	....	....	....	....	152.55
Totals.....	130,590.73	15,218.29	49,255.92	....	798.—	6,427.19	7,848.27	6,697.25	216,835.65
1913............	....	....	....	....	....	....	....	140.—	140.—
Totals.....	130,590.73	15,218.29	49,255.92	....	798.—	6,427.19	7,848.27	6,837.25	216,975.65
1914–1915........	252.95	....	....	....	....	....	....	....	252.95
Totals.....	130,843.68	15,218.29	49,255.92	....	798.—	6,427.19	7,848.27	6,837.25	217,228.60
1917 Dam at River	1,300.38	....	....	....	....	....	....	....	1,300.38
Totals.....	132,144.06	15,218.29	49,255.92	....	798.—	6,427.19	7,848.27	6,837.25	218,528.98
[fols. 60 & 61]									
Forward Totals to 1917..........	132,144.06	15,218.29	49,255.92	....	798.—	6,427.19	7,848.27	6,837.25	218,528.98
(Gardena) 1920 Concrete Pipe..	....	....	....	5,400.50	....	....	....	....	5,400.50
Totals.....	132,144.06	15,218.29	49,255.92	5,400.50	798.—	6,427.19	7,848.27	6,837.25	223,929.48
1924............	....	....	....	....	....	....	....	1,500.—	1,500.—
Totals.....	132,144.06	15,218.29	49,255.92	5,400.50	798.—	6,427.19	7,848.27	8,337.25	225,429.48
1925............	....	....	....	....	....	....	....	1,649.08	1,649.08
Grand Totals	132,144.06	15,218.29	49,255.92	5,400.50	798.—	6,427.19	7,848.27	9,986.33	227,078.56 Cost of System

The item "Wood Pipe" $15,218.29 is the wood stave pipe across Pine Creek to Gardena. Estimated cost about $25,000.00. The item "Concrete Pipe" 1920—Gardena is the pipe extending West along South line Section 5-6-33 to Paine land.

[fol. 62] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION No. 6—STATEMENT OF ISSUES AS TO GARDENA

With respect to the rights of the Gardena Farms District, successor in interest to the Walla Walla Irrigation Company, reserved for further treatment as item (1) of paragraph II in the stipulation of October 21, 1933, between the parties hereto.

The State of Oregon contests the rights of the Gardena Farms District as set forth in the decree of the Superior Court of the State of Washington for the County of Walla Walla in the case of State of Washington, plaintiff, vs. Chas. Achermann et als, defendants, No. 19075, which rights are there set forth under the name of the Walla Walla Irrigation Company under proof No. 570, and alleges as follows, to-wit:

I

The appropriators and their successors in interest have not been diligent in the application of water to a beneficial use so that the lands irrigated do not by relation secure a priority date as of the date of posting of notices of appropriation or the beginning of construction work upon the canals and diversion works. And each of the several tracts of land irrigated through the works of the Gardena Farms District has a priority date as of the year in which said tract was first irrigated, which dates are substantially shown by the contracts for the sale of water to said lands, as per list in agreed statement of facts. Lands not yet irrigated have no water right.

[fol. 63]

II

The original intention of the appropriators and the Walla Walla Irrigation Company was to construct a main canal from the diversion point in the McBean Donation land claim in the Southwest quarter of the Southwest quarter of Section 3, Township 6 North, Range 35 E. W. M., along the route of the canal shown on the official map in a Southwesterly direction to a point in Lot 3 of fractional Section 13, Township 6 North, Range 34 E. W. M., and thence Southerly into the State of Oregon, upon the line marked on the official map as "not in use in 1932," and across South Mud Creek, and also along the line marked on the official map, "used as Hudson Bay Lateral, 1932," across Dry Creek and thence West across Pine Creek, and thence Northwest along the line as indicated on the official map as "Walla Walla Irrigation Co. canal," and thence in a Northwesterly direction crossing into the State of Washington in Section 16, Township 6 North, Range 33 E. W. M., and thence to the Walla Walla River in Section 7, Township 6 North, Range 33 E. W. M. And to construct a lateral from said point in Lot 3 of fractional Section 13, Township 6 North, Range 34, E. W. M., in a Northwesterly direction to a point at about the North and South center line of Section 5, Township 6 North, Range 34 E. W. M., about 80 rods South of the center of said Section, and to construct a second lateral from said main canal from a point about the center of Section 24, Township 6 North, Range 34 E. W. M., in a Northwesterly direction for a distance of about two miles through Section 23, 14, and 15 in the same Township and Range; and to irrigate from said canals only such lands as could be conveniently served by open ditches. Said original intention did not contemplate the construction of any suphons for the purpose of irrigating any lands, or the irrigation of any lands for which a syphon was required.

In accordance with said intentions, said Walla Walla Irrigation Company constructed the main canal from said diversion point to said point in Lot 3 of said fractional Section 13, and also constructed their main canal from said point in said Lot 3 in a Southerly direction along the line [fol. 64] as shown on the official map into Oregon for a distance of 18 miles to a point in Section 19, Township 6 North, Range 34 E. W. M., and also constructed the two laterals above described. In the year 1904 said Walla Walla Irrigation Company changed their intentions and formulated a plan whereby said lateral constructed from said point in said Lot 3 of said fractional Section 13 was changed to a main canal and widened, from eight to ten feet on the bottom, and extended to the Southwest quarter of the Northwest quarter of Section 5, Township 6 North, Range 34 E. W. M., from which point a syphon was extended across the valley of Pine Creek for a distance of one and one-half miles to the Northeast quarter of the Southeast quarter of Section 12, Township 6 North, Range 33 E. W. M., from which point a distribution system for the irrigation of the lands West and South of the said syphon was constructed. By said change of intention and construction of canals and syphons, said Walla Walla Irrigation Company brought under irrigation about 1800 acres of land not included in their original appropriation, and which they could not have irrigated under their original plan, thereby initiating a new appropriation for said lands which could in no event have an earlier date of priority than 1904, irrespective of the question of diligence as raised in paragraph "I" herein. Thereafter, in the year 1919, said Walla Walla Irrigation Company abandoned all that part of its original main canal and lateral lying South and West of said point in Lot 3 of fractional Section 13, Township 6 North, Range 34 E. W. M., and abandoned its intention to irrigate any of the lands to be served thereby and not reached by their present distribution system.

III

As against the Gardena Farms District, as well as all other rights in the State of Washington, the State of Oregon raises the issue of vested rights, the Statute of Limitations, adverse use, and estoppel as set forth in its Answer on file herein, and alleges that as against the State of Oregon, its citizens and water users, the permits of the Supervisor of Hydraulics of the State of Washington for the appropriation of water, and the decrees of the Courts of the State [fols. 65 & 66] of Washington neither determine nor fix any rights.

IV

The State of Washington alleges and maintains that the rights of Gardena Farms District are as set forth in the decree of the Superior Court of the State of Washington in and for Walla Walla County, in the case of State of Washington, plaintiff, vs. Chas. Achermann, et als, defendants, No. 19075, and as set forth in the Certificate of water right referred to as exhibit "A" in the agreed facts on file herein.

V

The State of Washington challenges the legal sufficiency of each of the grounds of contest of the rights of Gardena Farms District as set forth by the State of Oregon, in paragraphs I, II, and III, herein, as constituting a defense or as sustaining any rights of the State of Oregon in this action.

VI

The State of Washington denies each and every allegation set forth in the contest of the rights of Gardena Farms District made by the State of Oregon herein, except as admitted in any statement of agreed facts which is now or may hereafter be filed in this case.

Dated at Walla Walla, Washington, this 29th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Asst. Attorney General of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

[fol. 67] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION No. 7—STATEMENT OF ISSUES AS TO WATER REQUIREMENTS

With respect to the water requirements of the lands to which water is awarded in any or all of the permits, or in any or all of the decrees which were reserved for further treatment as item (2) of paragraph II in the Stipulation of October 21, 1933, between the parties hereto;

The State of Washington *contests the rights of the State* of Oregon and its citizens and water users to the respective amounts of water awarded to and used by them by virtue of the decrees of the Courts of the State of Oregon and the permits of the State Engineer of the State of Oregon, or otherwise, and raises the following issues with respect to the water requirements of the soils of the related lands in the contested area in the State of Oregon classified according to soil types as indicated on the F. O. Youngs' soil map as affecting the rights of the respective states in this case.

I

The State of Washington alleges that the water requirements for soils falling in group Nos. ID, 4, and 5 should not exceed 1/80 of a second foot (½ miners inch) per acre during actual irrigation of the land, but limited to 3 acre feet apportioned ratably in each month during the summer irrigation season of 6½ months; that the water requirements for soils falling in group Nos. 1, 1R, and 1RA should not exceed 1/90 of a second foot (4/9 miners inch) per acre during actual irrigation of the land but limited to 4 [fol. 68] and 1/3 acre feet, apportioned ratably in each month during the summer irrigation season of 6½ months; that the water requirements for soils falling in group No. 2A should not exceed 1/50 of a second foot (4/5 miners inch) per acre during actual irrigation of the land, but limited to 6½ acre feet apprortioned ratably during each month during an irrigation season of 6½ months; that the water requirements for soils falling in group No. 2B should not exceed 1/45 of a second foot, (8/9 miners inch) per acre during actual irrigation of the land, but limited to 7½ acre feet apportioned ratably in each month during the summer irrigation season of 6½ months; that the water requirements for soils falling in group No. 3 should not exceed 1/40 of a second foot (1 miners inch) per acre during actual irrigation of the land, but limited to 9 3/4 acre feet apportioned ratably in each month during the summer irrigation season of 6½ months; that the allotments of water hereinabove specified shall in every instance be measured at the stream diversion point.

II

The State of Oregon alleges and maintains that the rights of said State and of its citizens and water users to the use of surface waters of said State are as fixed by the decrees of the Courts of said State, and the permits for the appropriation of water issued by the State Engineer of the said State, and by the use of said waters, and alleges that the decree on the mandate entered in the Circuit Court of the State of Oregon for Umatilla County in the matter of the Determination of the Relative Rights To The Use of the Waters of The Walla Walla River, Etc., dated February 20, 1933, fixes the right to the use of the surface waters in the part of the contested area covered by said decree in Oregon as follows:

(1). For all lands irrigated under permit by the Pleasant View Irrigation Company a flow of 1/80 cubic foot per second per acre, (.0125 c. f. s.) plus 20 per cent for transportation losses.

(2). For all lands irrigated by the Milton-Freewater and [fol. 69] Hudson Bay Irrigation Company a flow of 75 cubic feet per second for 2675.76 acres.

(3). For the F. Mauch and Margaretha Mauch land (Proof No. 543) a flow of 2 miners inches per acre (.05 c. f. s.).

(4). For all other lands a flow of one and one-half miners inches per acre (.0375 c. f. s.) provided that where an irrigated tract is less than one acre and more than one-half acre it should receive a flow of one and one-half miners inches (.0375 c. f. s.), and where less than one-half acre it should receive a flow of one miners inch, (.025 c. f. s.).

The decree in the Circuit Court of the State of Oregon for Umatilla County in the matter of the Determination of the Relative Rights to the Use of the Waters of The West Prong of the Little Walla Walla River, Etc., dated September 11, 1916, fixes the rights to the use of surface waters in the part of the contested area covered by said decree for each tract of land separately, and fixes the flow for each tract of land at respective amounts from one-half miners inch per acre, (.0125 c. f. s.) to 1¼ miners inches per acre, (.03125 c. f. s.).

The permits for the appropriation of water issued by the State Engineer of Oregon fix the rights to the use of surface water in the part of the contested area covered by said permits at a flow of ½ miners inch per acre, (.0125 c. f. s.) except as to the Pleasant View Irrigation Company, an additional amount of 20 per cent was allowed by the Court for transportation losses.

A miners inch under the Oregon law is equivalent to 1/40 of a cubic foot per second and all measurements under Oregon decrees and permits are made at the point of diversion. The said decrees and permits further limit the use of water to the amount required for beneficial use not to exceed the amounts hereinabove stated.

III

The State of Oregon alleges the stream is subject to an annual spring freshet, during which the water supply [fol. 70] greatly exceeds any use, and during said time the overplus is not used and runs to waste into the Columbia, and said stream is flashy throughout the year; the crops raised are diversified and require irrigation at different times of the year according to the crop, and any limitation on an acre foot basis is impracticable and would destroy the flexible use of the water to which the water users have acquired a right.

IV

The State of Oregon challenges the legal sufficiency of the grounds of contest of the rights of the State of Oregon, its citizens, and water users to the respective amounts of water awarded to and used by them, and the issues raised with respect to the water requirements of the soils of the related lands in the contested area in the State of Oregon as set forth in paragraph I herein as constituting a cause of action or as sustaining any rights of the State of Washington in this action.

V

The State of Oregon denies each and every allegation set forth in the contest of the rights of the State of Oregon, its citizens and water users to the respective amounts of water awarded to and used by them upon the lands in the contested area except as admitted in any statement of agreed facts which is now or may hereafter be filed in this case; and the State of Oregon alleges that the use of the several amounts of water as alleged by the State of Washington in paragraph I would not produce or mature the crops upon the lands in said contested area.

VI

As against the contest by the State of Washington on the rights of the State of Oregon, its citizens and water users to the respective amounts of water awarded to and used by them on the lands in the contested area, the State of Oregon raises the issue of vested rights, the Statute of Limitations, adverse use and estoppel as set forth in its Answer on file [fols. 71 & 72] herein.

VII

The affirmative allegations on the part of the State of Oregon above set forth are deemed denied by the State of Washington.

Dated at Walla Walla, Washington, this 29th day of November, 1933.

G. W. Hamilton, Attorney General of Washington; Geo. G. Hannan, Asst. Attorney General of Washington: Fred. F. Cunningham, T. A. Paul, Special Counsel for State of Washington. J. H. Van Winkle, Attorney General of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for State of Oregon.

[fol. 73] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 8—RELATING TO DECREES, ETC.

It is hereby stipulated by and between the undersigned counsel for the respective states:

That the several decrees referred to in paragraphs I and II in the stipulation of October 21, 1933 between the parties hereto shall be considered in this case in their relation to the respective Findings and orders of Determination of its State Water Board or State Engineer, as the case may be, of the State of Oregon and to the respective Findings and Reports of the Referee of the State of Washington, filed in each case in which each of said decrees was rendered, and each of said Findings and orders of Determination and each of said Findings and Reports shall be admitted in evidence in this case as supplemental to and as a part of said respective decrees, as competent proof, so far as applicable affecting the individual rights specified in said decrees and affecting the respective rights of the two [fols. 74 & 75] states in this action.

Dated at Walla Walla, Washington, this 8th day of December, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Assistant Attorney General for the State of Oregon; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; George T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 76] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 9—STATEMENT OF ISSUES AS TO WELLS

With respect to the relation of wells and of the rights of the users thereof for irrigation in the State of Oregon, to the stream system and to the rights of lower diverters therefrom for lands in the State of Washington, which were reserved for further treatment as item (5) of paragraph II in the stipulation of October 21, 1933, between the parties hereto:

The State of Washington contests the rights of the State of Oregon its officials, agents, citizens and water users, to grant state permits for and to use water from wells located in the area indicated on the official map, by virtue of said permits or otherwise, for irrigation without regard to the rights and requirements of the State of Washington, its citizens and water users, and raises the following issues with respect thereto, as affecting the rights of the respective states in this case.

I

The State of Washington alleges that the State of Oregon its officers and agents have sa-ctioned and permitted the use of, and the users of the waters of said wells have used and are using said waters for irrigation, in excess of the amounts necessary for said purpose; also without regard to the rights of the lands to water by surface diversion from the stream system; and further without regard to the rights of the diverters of water from the stream system to the benefits of the natural underground drainage to the [fol. 77] stream;

II

The State of Washington further alleges that the surface supply of water in the stream system during the summer irrigation season in each year is inadequate to satisfy the individual rights on said stream system according to their respective priorities in both states; that the use of water from said wells as aforesaid, results in a waste of water, intercepts a source of natural supply of the water of the stream system, reduces the natural supply of the waters of the river for use in the State of Washington and deprives the State of Washington, its citizens and water users, of their just and equitable share of the waters of the stream system.

III

The State of Oregon challenges the legal sufficiency of the grounds of contest of the rights of the State of Oregon, its citizens and water users as set forth in paragraph I and II, and the issues raised therein with respect to the wells in the State of Oregon for the reasons that the same do not constitute a cause of action or sustain any rights of the State of Washington in this action.

IV

The State of Oregon denies each and every allegation set forth in the contest of the rights of the State of Oregon, its citizens and water users relative to the wells in the contested area in Oregon as set forth in paragraphs I and II above, except as admitted in any statement of agreed facts, which is now or may hereafter be filed in this case.

V

The State of Oregon alleges that the wells in question were dug up- the lands owned by the citizens and water [fol. 78] users of the State of Oregon, and the waters in said wells were and are percolating waters in the soil of said land owners and belong entirely to said land owners under the laws of both the States of Oregon and Washington.

The State of Washington, its citizens and water users have no ownership in or access to said perlocating waters, or any part thereof.

The State of Oregon issues permits for the use of wells and waters therein for irrigation, but only for the purpose of recording said use.

The ownership of said percolating waters and the right to the use thereof is a vested property right, and neither the State of Oregon nor the State of Washington has any right to regulate the use of such percolating waters under the laws of either State.

The wells in the State of Oregon and the water therein constitute no part of the Walla Walla River or its stream system, and the regulation of the use of said percolating waters is not within the jurisdiction of this Court.

The pumping of waters from said wells does not appreciably affect the supply of underground water, and in no way injures any citizen or water user of the State of Washington, or deprives them of any water. The use of said water from said wells for irrigation purposes immediately returns the same to the underground supply without waste and without dimunition except for less by evaporation and plant use.

The wells used for irrigation were dug and equipped at a large expense. The pumping of water therefrom, on account of the cost of power and the depreciation of equipment, costs each user large sums of money each year. Said expenditures regulate the extent of the use of said wells and said wells are used only for a beneficial use and as a supplemental supply, as and when the supply of surface water to the respective well owners from the streams and springs [fols. 79 & 80] diminishes, or is shut off on account of insufficient water in such streams and springs to supply the appropriations.

VI

The affirmative allegations on the part of the State of Oregon, above set forth, are deemed denied by the State of Washington, except as admitted in any statement of agreed facts, which is now or may hereafter be filed in this case.

Dated at Walla Walla, Washington this 9th day of December, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Assistant Attorney General for the State of Washington; Fred F. Cunnningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; George T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 81] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 10—STATEMENT OF ISSUES AS TO ADVERSE USE, ESTOPPEL, VESTED RIGHTS, TUM-A-LUM RIVER AND SEPARATE ADMINISTRATION IN OREGON

With respect to the issues which were reserved for further treatment as items (4) and (7) of paragraph "II" in the stipulation of October 21, 1933, between the parties hereto:

The State of Oregon contests the right of the State of Washington, its citizens and water users, to assert any right to the use of the waters of the Walla Walla River and its tributaries flowing in Oregon as against or prior to any appropriation in the State of Oregon by the citizens and water users of said state, for the following reasons, and alleges:

I

By appropriation, diversion and use the State of Oregon, its citizens and water users, have acquired by adverse use and prescription the right to the use of all or so much of the waters of the Walla Walla River and its tributaries flowing in Oregon as is required to supply the appropriations of the citizens and water users of said State according to the priorities and in the amounts and for the acreages as set forth in the decrees of the Courts of said State, and the permits issued by the State Engineer of said State; and said rights of said citizens and water users of said State are rights vested in the citizens and water users of the State of Oregon by said appropriation, diversion, adverse use and prescription without regard to any claim of [fol. 82] right or diversion or use on the part of any lower diverter from said stream in the State of Washington, and are prior in time and superior in right to any claimed rights of the State of Washington, its citizens and water users.

II

The State of Washington, its citizens and water users are estopped from asserting any right to the use of the waters of the Walla Walla River and its tributaries flowing in Oregon as against or prior to any appropriation in the State of Oregon by the citizens and water users of said State, for that:

Believing and asserting that they were acting within their legal rights and relying upon the appropriations, diversions and use of water from said stream without regard to any claim of right of diversion or use on the part of any lower diverter from said stream in the State of Washington, the State of Oregon, its citizens and water users, have expended large sums of money in building diversions and distribution works; cultivating and planting the lands irrigated by the waters of said stream; building and establishing homes upon said lands; constructing other works, buildings and improvements of great value, and developing and building cities, industries, towns and communities all depending upon the use of said waters for their existence. A population of about 5,000 people have established their homes within the contested area and are dependent upon said development and the use of said water in Oregon. Concerning all the foregoing development the said State of Washington, its citizens and water users, at all times had notice and knowledge. And said State of Washington, its citizens and water users remained silent and permitted and acquiesced in the construction and erection of said works, buildings, improvements and developments, and expenditures of money, together with the diversion of water for such development without taking any steps to prevent the same, or making any protest against such use of said waters; or asserting any claim or right to the use of said [fol. 83] waters as against the State of Oregon, its citizens and water users; and now to permit the State of Washington, its citizens and water users to deprive the State of Oregon, its citizens and water users of said water, or any portion thereof, would make said lands barren and nonproductive, and render said improvements and development valueless to the irreparable damage and injury to the State of Oregon, its citizens and water users.

III

At all times from the beginning or irrigation in the State of Oregon, said State, its citizens and water users have distributed and used the waters of the Walla Walla River and its tributaries for irrigation, domestic, power, and manufacturing purposes as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington, and beginning with about the year 1888, such use and distribution of water has turned all water, not necessary for irrigation out of the Tum-A-Lum, into the Little Walla Walla River, and rendered the Tum-A-Lum River in Oregon dry during the months of July, August, and September of each year, and during a part of June and a part of October in many years; and all appropriations and diversions of water in the State of Washington made after said year of 1888 were made with notice and knowledge that said Tum-A-Lum River went dry each year during the said dry season, and subject to the limitation of water supply occasioned by said stream going dry during said season, and without the intention of claiming or asserting any right to have water flow in said Tum-A-Lum River during said dry season. That the Tum-A-Lum River in Oregon is a losing stream and its continuation in Washington, as the Walla Walla River, is a gaining stream, and at the time in each year the Tum-A-Lum River in Oregon goes dry there remains flowing in the Walla Walla River and its tributaries in Washington more than sufficient water to supply all claimed rights. Said Tum-A-Lum River is a stream with a bed from 100 to 1500 feet wide in a coarse, gravelly soil, through which the water readily sinks [fol. 84] and percolates, and to conduct water in said channel during said dry season would require the full flow of the stream and would cause an unreasonable waste.

IV

In support of the foregoing propositions and adding thereto, the State of Oregon alleges that beginning in the year 1862 the citizens and water users of the State of Oregon began to appropriate, divert, and use water from the Walla Walla River in Oregon, and in each year thereafter made new appropriations and increased the amount of water so appropriated, diverted, and used, until in the year 1891 there were about 2552.62 acres of land irrigated in the contested area in Oregon for the irrigation of which substantially 100 second feet of water were diverted from said stream and beneficially used.

In the State of Washington at said time there were irrigated about 285 acres from the Walla Walla River, and about 177.69 acres from the East Little Walla Walla River, and about 546.90 acres from the West Little Walla Walla River.

In 1888 there were appropriated, diverted and used for power purposes in Oregon from the Walla Walla River 56.25 second feet of water, which said water was diverted from the Tum-A-Lum River and discharged into the Little Walla Walla River. From and after said appropriation the Tum-A-Lum has each year gone dry during the months of July, August, and September, and during a part of June and a part of October in many years.

In the year 1890 the City of Milton, Oregon, a municipal corporation, appropriated and began the diversion and use of 7.24 second feet of water from the Walla Walla River, which said water was used in the City of Milton, Oregon, for domestic, municipal, and irrigation purposes, and was not returned to said stream.

In 1892, and each year thereafter, the citizens and water users of the State of Oregon continued to make new appropriations and to increase the amount of water so used for [fol. 85] irrigation until the year 1903, when appropriations for irrigation use had been made for 6907.79 acres, which said appropriations have been fully completed and the water therefor diverted and used.

In 1898 an additional appropriation of 12.5 second feet of water from the Tum-A-Lum River for power purposes was made and said amount of water was thereupon and thereafter diverted from said Tum-A-Lum River and used for power purposes and discharged into the Little Walla Walla River.

In 1904, and each year thereafter, the citizens and water users of the State of Oregon continued to make new appropriations and to increase the amount of water used for irrigation purposes as shown in the agreed statement of facts in the tabulation of acreages irrigated.

All diversions made from the Walla Walla River at points North of the South line of Section 12, Township 5 North, Range 35 E. W. M., excepting not to exceed 13 second feet, diverted water away from the Tum-A-Lum River and either into the Little Walla Walla River in Oregon, or in a Northwesterly direction for irrigation purposes so that none of said water diverted and used returned to said Tum-A-Lum River. Said diversions for irrigation, and from the Tum-A-Lum River to the Little Walla Walla River, have continued each and every year so that the Tum-A-Lum River has gone dry as aforesaid from and including the year 1888 to the present time.

The diversions, appropriations, and use of said water by each and all of the citizens and water users of the State of Oregon have at all times been open, continuous, notorious, adverse, and hostile to the citizens and water users of the State of Washington and the whole world; and said water was appropriated, diverted, and used under right and claim of right by the citizens and water users of the State of Oregon, and such diversion and use was well known to the citizens and water users of the State of Washington, and deprived them of the use of said water.

[fol. 86] Concerning all of the foregoing, the State of Washington, its citizens and water users, at all times have had notice and knowledge and remained silent without protest or assertion of any claim of right to the use of said water, and permitted and acquiesced in the diversion and use of the said water by the citizens and water users of the State of Oregon for a period long exceeding the statutory term of adverse use of ten years as fixed by the laws of both the States of Oregon and Washington.

The amount of water beneficially used upon said lands by said citizens and water users of the State of Oregon is and has been as set forth in the decrees of the Courts of Oregon adjudicating the rights of the streams involved in the said contested area, and the permits for the appropriation of water issued by the State Engineer of the State of Oregon.

During the period of irrigation from 1862 to the present time the citizens and water users of the State of Oregon have developed and improved by the use of said water the territory included in the contested area, as set forth in paragraph "II" above, concerning all of which the State of Washington, its citizens and water users, had notice and knowledge, and all of which would be rendered valueless should said lands be deprived of said water, to the irreparable damage and injury of the State of Oregon, its citizens and water users.

In the year 1905 a suit was commenced in the Circuit Court of the State of Oregon for Umatilla County for the purpose of adjudicating the water rights of the Walla Walla River in the State of Oregon, and thereafter jurisdiction was acquired over all defendants and such proceedings were had that on the 19th day of September, 1910, a decree was entered in said Court fixing, determining, and adjudicating the rights of all parties to said suit to the use of the waters of the Walla Walla River. Immediately [fol. 87] thereafter the State of Oregon by and through its officers and water masters began the distribution of the waters of the Walla Walla River under and by virtue of, and in accordance with said decree. Thereafter an appeal was duly taken from said decree to the Supreme Court of the State of Oregon and such proceedings were had that a decree was rendered by said Supreme Court and the mandate returned to said Circuit Court of Umatilla County, Oregon, and a decree entered thereon on the 18th day of November, 1912. Continuously thereafter said water was distributed to the water users of the State of Oregon in accordance with said decree so entered upon said mandate until findings and Order of Determination were duly filed in the Circuit Court of the State of Oregon for Umatilla County by the State Engineer of Oregon in a proceeding under the Oregon Water Code of 1909 entitled: "In the Matter of Determination of the Relative Rights to the Use of the Waters of the Walla Walla River and Its Tributaries," etc. Thereafter such proceedings were duly taken that the Circuit Court of the State of Oregon for Umatilla County made and entered its decree up[illegible] mandate of the Supreme Court of said State in said proceedings on the 25th day of February, 1933. Thereafter the water has been distributed by the State of Oregon through its officers and watermasters in accordance with the terms of said decree on the mandate.

The waters of the West Little Walla Walla River, called the West Prong in Oregon, have been distributed by the State of Oregon, its officers and water masters under and in accordance with the provisions of the decree entered in the Circuit Court of the State of Oregon for Umatilla County in "The Matter of the Determination of the Relative Rights to the use of the Waters of the West Prong of the Little Walla Walla River," etc., since the entry thereof on September 11, 1917.

After the adoption of the Water Code of Oregon in the year 1909, the State Engineer of Oregon has issued divers permits for the appropriation of water in the contested [fol. 88] area, and as said permits were issued, the Water Master of Umatilla County, Oregon, has thereafter distributed water to the lands described in said permits in accordance with the terms thereof, and the laws of the State of Oregon.

The distribution of water by said water master, in accordance with said decrees and permits, has been for beneficial use for domestic, irrigation, power, and manufacturing purposes, and said water has been distributed by said water master from the Walla Walla River, West Little Walla Walla River, called West Prong in Oregon, and the East Little Walla Walla River, called East Prong in Oregon, as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington, and without regard to any claim of right of diversion or use on the part of any lower diverter from said stream in the State of Washington.

The citizens and water users of the State of Washington at all times have had notice and knowledge of the several decrees of the State of Oregon and of the distribution of water thereunder.

V.

The State of Washington reserves its rights under its motion to strike affirmative defenses heretofore filed in this action and reasserts its contention and claim thereunder, as against the allegations, contentions and claims of the State of Oregon as set forth in paragraphs I to IV both inclusive of the foregoing statement of issues herein.

VI.

The State of Washington challenges the legal sufficiency of each of the allegations, contentions and claims of the State of Oregon as set forth in paragraphs I to IV both inclusive of the foregoing statement of issues herein, as constituting a defense, or as sustaining any rights of the State of Oregon in this action.

VII.

The State of Washington denies each and every allegation, [fol. 89] contention and claim of the State of Oregon set forth in paragraphs I to IV, both inclusive of the foregoing statement of issues herein, except as hereinafter admitted and except as admitted in any statement of agreed facts which is now or may hereafter be filed in this case.

VIII.

The State of Washington further denies that the citizens and water users of the State of Oregon have any vested rights, as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to the waters of the Walla Walla River and its tributaries or to any part of the same at any place, in excess of the amounts reasonably necessary for their respective beneficial uses, according to their respective priorities set out in the decrees and abstracts of permits, referred to in paragraphs I and II of the Stipulation of October 21, 1933, between the parties hereto as supplemented by the stipulation of December 8th, 1933, between the same parties, and the State of Washington alleges that in regulating, supervising and apportioning the appropriation, diversion, distribution and use of the adjudicated individual rights of their citizens and water users, the State of Oregon, its officials, and agents have generally established, sanctioned and enforced and are generally establishing, sanctioning and enforcing the maximum per acre allotment set out in said decrees as the standard of distribution and apportionment for the lands in the related area regardless of their respective water requirements, and in some instances the State of Oregon, its officials and agents have apportioned and distributed said water to said lands in excess of the maximum water requirements named in said decrees for said respective lands, and said State, its officers and agents have not apportioned and distributed and are not apportioning and distributing said water on the principle of beneficial use, and by reason thereof the rights of the State of Washington, [fol. 90] its citizens and water users have been injured and impaired.

IX.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to the waters of the Walla

Walla River and its tributaries, or to any part of the same at any place, to satisfy rights in the related area in the State of Oregon, junior in priority, as set out in the decrees and abstracts of permits referred to in paragraphs I and II of the Stipulation of October 21, 1933, between the parties hereto, as supplemented by the Stipulation of December 8th, 1933, between the same parties, to that of the diverters and water users affected thereby in the State of Washington, and the State of Washington alleges that in regulating, supervising and apportioning the appropriation, diversion, distribution, and use of said individual rights of their citizens and water users, the State of Oregon, its officials, and agents have disregarded, and are disregarding, the rights of the State of Washington, and of the diverters and water users of water from the Walla Walla River and its tributaries in the State of Washington, by diverting, permitting the use of, apportioning, and distributing said water from the Walla Walla River and its tributaries to satisfy rights for lands in the related area in the State of Oregon, junior in priority, as set out in said decrees and abstracts of permits hereinabove mentioned, to that of the diverters and water users affected thereby in the State of Washington, and by reason thereof the rights of the State of Washington, its citizens and water users, have been injured and impaired.

X.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and [fol. 91] water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise, to the waters of the Walla Walla River and its tributaries, or to any part of the same at any place, by appropriating, diverting, distributing, and using, during the summer irrigation season through the Little Walla Walla River, the entire surface supply of the main stream at that place to satisfy rights for lands in the related area in the State of Oregon, as set out in said decrees and abstracts of permits hereinabove mentioned, junior to those in the State of Washington, affected thereby, which junior rights in some instances are so used by reason of their place of use that the return water therefrom does not reach the main stream and its tributaries above the principal diversions therefrom in the State of Washington, and the State of Washington alleges that in regulating, supervising, and apportioning the appropriation, diversion, distribution, and use of said water, as aforesaid, the State of Oregon, its officers and agents, have apportioned and distributed and are apportioning and distributing said water in the manner aforesaid and by reason thereof the rights of the State of Washington, its citizens and water users, have been injured and impaired.

XI.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise, to any water of the Walla Walla River and its tributaries by reason of the expenditure of any labor and money, or of any belief or reliance, on the part of the State of Oregon, its citizens and water users, or by reason of any silence, acquiescense, action, or failure of action on the part of the State of Washington, its citizens and water users, all as set forth and claimed in paragraph II herein, and the State of Washington al- [fol. 92] leges that said State, its citizens and water users, have also believed and asserted that they were and have been acting within their legal rights; have also relied upon their appropriations, diversions, and use of water, and have expended large sums of money and labor for purposes similar to that specified in said paragraph II herein, and by reason thereof, as well as for other reasons set forth herein, the State of Washington, its citizens and water users, are entitled to a just and equitable share of the waters of said stream system.

XII.

The State of Washington also denies that the citizens and water users of the State of Oregon have any vested rights as against the State of Washington, its citizens and water users, by appropriation, diversion, adverse use, prescription, estoppel, or otherwise to any water of the Walla Walla River and its tributaries by reason of the contention and alleged claim set out in paragraph III herein, that at all times from the beginning of irrigation in the State of Oregon, said State, its citizens and water users, have distributed and used said water for irrigation, domestic, power, and manufacturing purposes as a stream system wholly in Oregon, separate and independent of any part thereof in the State of Washington; and the State of Washington alleges that the Walla Walla River and its tributaries constitute an interstate stream system; that the natural downward course of water is continuous through the same; that the natural loss of water in the Tum-A-Lum section of the stream is not excessive, the gradient in the same being approximately 60 feet to the mile; that the water naturally disappearing in the surface of said section remains in the stream system, and contributes to the supply of the water of the river and its tributaries in the State of Washington; that the State of Oregon, its citizens and water users, do not, and cannot, legally have, as against the State of Washington, its citizens and water users, the exclusive right to the waters of said stream system or [fols. 93 & 94] any part of the same in the State of Oregon; that the surface supply of water in the stream system during the summer irrigation season in each year is inadequate to satisfy all the individual rights on said stream system according to their respective priorities in both states; that the distribution and use of the waters of the Walla Walla River and its tributaries by the State of Oregon, its officers, agents, citizens, and water users, as a stream system wholly in Oregon, separate and independent of any part of said system in the State of Washington, to the extent to which the same may in any year have been accomplished, without regard to the rights of citizens and water users of the State of Washington, reduces the natural supply of the waters of the river for use in the State of Washington and deprives the State of Washington, its citizens and water users, of their just and equitable share of the waters of the stream system.

XIII

The State of Washington alleges that as against the State of Washington, its citizens and water users, the decrees of the Courts of the State of Oregon, and the permits of the State Engineer of said state, neither determine nor fix any rights, except as admitted in this cause.

XIV

The affirmative allegations on the part of the State of Washington above set forth are deemed denied by the State of Oregon, except as admitted in any statement of agreed facts, which is now or may hereafter be filed in this case.

Dated at Walla Walla, Washington, this 9th day of December, 1933.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Asst. Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for Washington. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon.

[fol. 95] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 11—STATEMENT OF AGREED FACTS AND AS TO RIGHTS BY APPROPRIATION

The following facts are stipulated and agreed:

I

Originally Washington was a part of what was popularly called the Oregon country. At this time the United States, Great Britain, Spain and Russia made claim to all or parts of this region. By treaty between the United States and Spain, February 22, 1819, Spain ceded to the United States all her rights in this region, north of the forty-second parallel. (8 U. S. Stat. L. 252.) By treaty with the United States, April 5, 1824, Russia relinquished her claims to this territory. (8 U. S. Stat. L. 302.) By treaty of October 20, 1818, the United States and Great Britain agreed that for a period of ten years the territory on the northwest coast of America westward of the Stony Mountains (Rocky Mountains) should be free and open to the vessels, citizens and subjects of both powers. (8 U. S. Stat. L. 248.) This treaty was indefinitely continued in force by another treaty between the same parties on August 6, 1827, which pro-

[fol. 96] vided that either party, at any time after October 20, 1828, might annul it by giving twelve months' notice to the other party. (8 U. S. Stat. L. 360.) By joint resolution of the senate and house of representatives, under date of April 27, 1846, the President of the United States was authorized to give Great Britain the notice that was required for the abrogation of the treaty of August 6, 1827. (9 U. S. Stat. L. 109.) The joint occupation of the territory between the Rocky Mountains and the Pacific coast was finally terminated and the boundary line between the possessions of Great Britain and the United States was fixed as the forty-ninth parallel of north latitude, Great Britain retaining the island of Vancouver, by treaty June 15, 1846. (9 U. S. Stat. L. 869.)

On May 2, 1843 the inhabitants of the Oregon Country which was a somewhat indefinite term for the area drained by the Columbia River and lying west of the summit of the Rocky Mountains, met at Champoeg and organized a provisional government under the suzerainty of the United States. On July 5, 1845, representatives of the people again met and adopted what is known as the Organic Law of Oregon (Rev. Stat. Territory of Oregon, P. 33). This act was submitted to the people and ratified by popular vote on July 26, 1845.

All the territory of the United States lying west of the summit of the Rocky Mountains, north of the forty-second degree of north latitude was organized into the territory of Oregon, August 14, 1848. (9 U. S. Stat. L. 323.) The territory of Washington was created out of part of the territory of Oregon by act of Congress, March 2, 1853. The territory of Washington included the present State of Washington and that portion of Idaho and Montana which is north of the forty-sixth parallel and west of the Rocky Mountains. (10 U. S. Stat. L. 172.) The constitution of Oregon was adopted by convention on September 18, 1857. This constitution so adopted became effective upon the admission of the State of Oregon to the Union by Act of Congress passed February 14, 1859, (11 Stat. L. 383) and by the acceptance by the State of the propositions submitted by Congress, which propositions were approved [fol. 97] by the Legislative Assembly of Oregon on June 3, 1859 (Ore. Code 1930, PP. 31-37, 63 et seq.). The present boundaries of the State of Oregon were then fixed and all the remainder of the then territory of Oregon was made a part of the territory of Washington. (11 U. S. Stat. L. 383, 384.)

Under date of March 3, 1863 the territory of Idaho, with boundaries the same as the present State of Idaho, was organized. (12 U. S. Stat. L. 808.) On February 22, 1889 the Enabling Act, authorizing the Dakotas, Montana and Washington to form constitutions, was approved. The boundaries then fixed for the State of Washington were substantially the same as now existing. (Rem. Rev. Stats. of Wash. Vol. 1, P. 331.) The constitution of the State of Washington was adopted by an election held in the state on October 1, 1889 and on November 11, 1889, the President of the United States proclaimed the admission of the state into the Union. (Rem. Rev. Stat. of Wash. Vol. 1, P. 347.)

II

All the lands in the drainage area of the Walla Walla River in both states were originally public lands of the United States and that part of these lands now held in private ownership has been generally acquired under the public land laws of the United States; the lands along the upper reaches of the river were, at the time of the respective segregations from the public domain of the lands lower down on the stream system, and have been since, public lands of the United States and are now a part of the Umatilla National Forest Reserve.

III

It is agreed that, for the purposes of this case, the individual rights of the respective land owners and water users concerned in both states are governed by the doctrine of appropriation and that no issue of riparian ownership as to such individual rights shall be raised in this case by either state.

[fols. 98 & 99] Dated this 14th day of January, 1934.

G. W. Hamilton, Attorney General for the State of Wash.; Geo. G. Hannan, Assistant Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Wash., Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 100] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION NO. 12—RELATING TO EXHIBITS

It is hereby stipulated by and between the undersigned counsel for the respective states:

That each and all of the exhibits introduced in evidence before the Special Master at the hearing held at Walla Walla, Washington, March 26, 1934 to and including April 6, 1934, or any part of said exhibits, may be considered by said Special Master in making his findings, conclusions and recommendations for a decree in this cause without the incorporation of said exhibits or any of them in the briefs of counsel submitted in the cause prior to the making of said findings, conclusions and recommendations, provided that the provisions of this stipulation shall be subject, and without prejudice, to any objection made by counsel for either party to the case, to the introduction of any of said exhibits in evidence, and shall be subject, and without prejudice, to any motion made by counsel to strike any of said exhibits from the evidence in the case, and provided [fols. 101 & 102] further, that nothing herein contained shall be construed as preventing either party from incorporating any of said exhibits or any part of the same in its brief, as its counsel may deem proper for the support of the arguments submitted therein or for the convenience of the Court and Special Master.

Dated this 25th day of May, 1934.

G. W. Hamilton, Attorney General for the State of Washington; Geo. G. Hannan, Assistant Attorney General for the State of Washington; Fred F. Cunningham, T. A. Paul, Special Counsel for the State of Washington, Attorneys for Complainant. J. H. Van Winkle, Attorney General for the State of Oregon; Geo. T. Cochran, C. Z. Randall, of Special Counsel for the State of Oregon, Attorneys for Defendant.

[fol. 103] WASHINGTON EXHIBIT No. 16

United States Department of the Interior, Geological Survey, Washington

Ground water in the Walla Walla Basin, Oregon-Washington

Lodi, California, October 30, 1933.

[fol. 104] Department of the Interior, United States Geological Survey

Ground Water in the Walla Walla Basin, Oregon-Washington

By A. M. Piper, T. W. Robinson, and H. E. Thomas

Prepared in cooperation between the United States Geological Survey, the Oregon State Agricultural Experiment Station, the Oregon Department of Water Resources, and the Washington Department of Conservation and Development.

[Stamp:] U. S. Geological Survey. Advance Data-Subject to Revision. Arthur M. Piper, Geologist. Released A. M. P. Oct. 30, 1933. Original data by —— ——. Compiled by —— ——. Checked by H. E. T.

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[fol. 109] Ground Water in the Walla Walla Basin, Oregon-Washington

By A. M. Piper, T. W. Robinson, and H. E. Thomas

Introduction

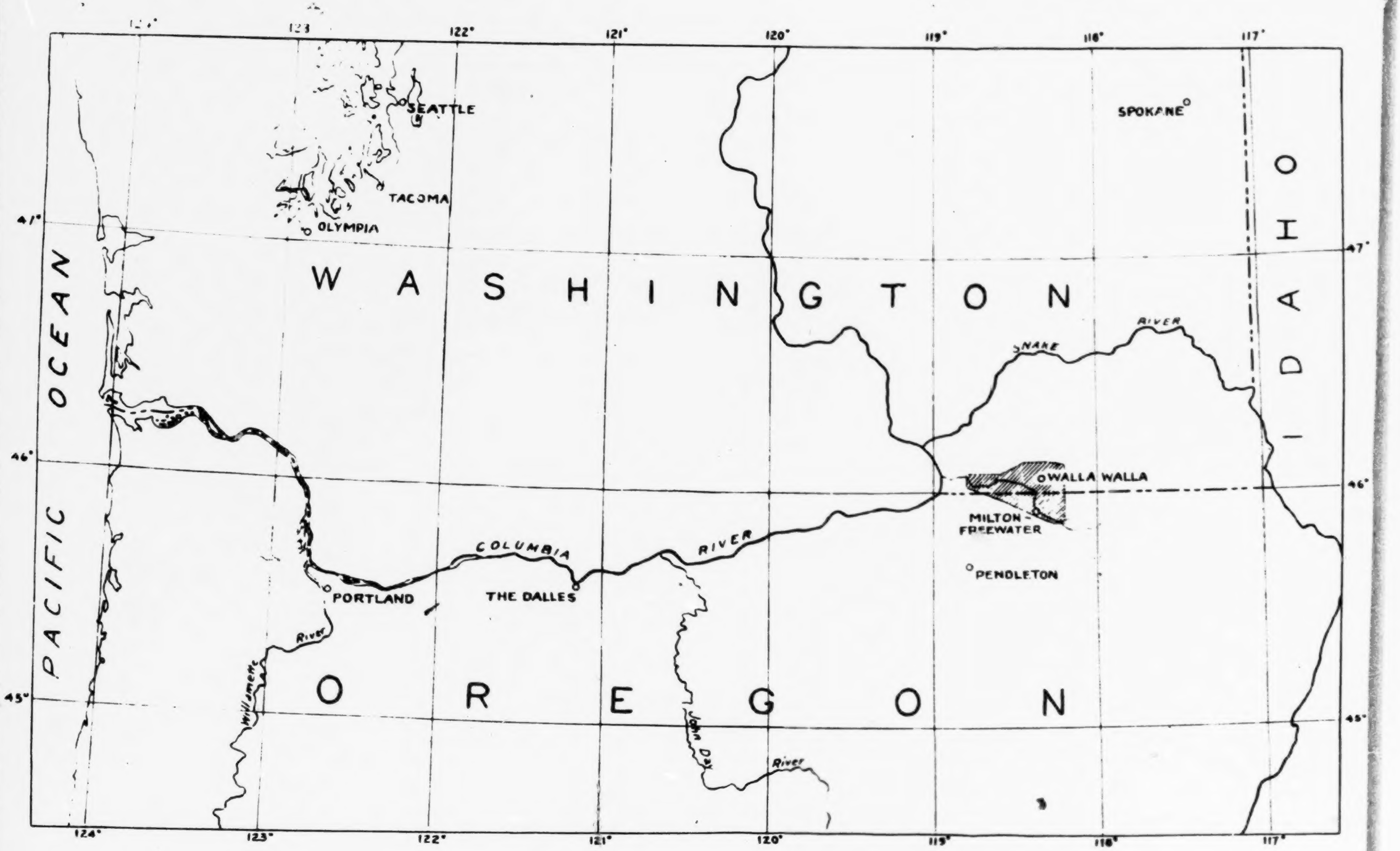
Location and Extent of the Area

The area described in this report comprises parts of Umatilla County, in northeastern Oregon, and of Walla Walla County, in southeastern Washington, and covers 295 square miles in Ts. 5 to 8 N., Rs. 32 to 37 E., Willamette meridian; it covers the central part of the drainage basin of the Walla Walla River, which is an interstate stream and a minor tributary of the Columbia River. The location of the area with respect to the boundaries of the two States is shown by the following index map (fig. 1).

Figure 1.—Index map of Oregon and Washington showing location of the Walla Walla Basin (shaded area).

Walla Walla, Washington, which in 1930 had a population of 15,976, is the largest city in the area and is the commercial center of the surrounding region; it is also the seat of Walla Walla County, Milton, with a population of 1,576, and Freewater, population 732, are the principal communities in the part of the area which lies in Oregon.

(Here follows map, side folio 110.)



124°
123°
122°
121°
120°
119°
118°
117°
47°
46°
45°
SEATTLE
SPOKANE
TACOMA
OLYMPIA
WASHINGTON
IDAHO
PACIFIC OCEAN
SNAKE RIVER
WALLA WALLA
MILTON - FREEWATER
PENDLETON
COLUMBIA RIVER
PORTLAND
THE DALLES
Willamette River
John Day River
OREGON

Figure I. Map of Oregon and Washington showing location of the Walla Walla Basin (shaded area).

[fol. 111] Purpose, Scope, and History of the Investigation

The investigation whose findings are the basis of this report is one item in a broader program of investigation which seeks data upon which to adju-cate the rights of the States of Oregon and Washington to the water of the Walla Walla River and its tributaries. The problems of adjudication and allocation of the surface water are complex, the more so because irrigation of the diversified fruit, vegetable, and forage crops has drawn so heavily upon the river in recent years that recourse has been taken to pumping from wells to supplement the supply of water during periods of minimum stream flow. Because of stringencies of time and of available funds the investigation was undertaken with limited objectives, namely: to establish the relation between the Walla Walla River and the body of ground water which supplies the irrigation wells and certain perennial springs on the valley plain in the vicinity of Milton and Freewater, and to ascertain the general ground water conditions of the area insofar as they might influence that relation.

The investigation was made by the United States Geological Survey acting in cooperation with the Oregon Agricultural Experiment Station, the Oregon Department of Water Resources, the Umatilla County Court (Oregon), and the Washington Department of Conservation and Development. Its technical direction was in the hands of O. E. Meinzer, geologist in charge of the division of ground water in the Federal organization.

[fol. 112] A reconnaissance of the area was made by the senior writer (Piper) August 19-23, 1932, when the potential investigation was conceived as a basis for a comprehensive allocation of all the surface water and ground water resources of the area. At that time 13 observation wells were selected in key locations and measurements of the depth to water were made. In November and December of that year, 23 additional observation wells were selected by M. R. Lewis for the Agricultural Experiment Station and levels were run to all 36 wells by D. G. Glass for the Oregon Department of Water Resources. Between December, 1932, and the following April, measurements of the depth to water in these observation wells were made at irregular frequency by W. C. Mason, assistant watermaster (Umatilla County) and for the Department of Water Resources. In this work the Geological Survey acted as adviser. On May 1, 1933, when the cooperative investigation was undertaken in its limited scope, the senior writer began the geologic map of the basin (Pl. 1) and T. W. Robinson undertook the study of hydrologic features under his supervision. Beginning July 1, H. E. Thomas was assigned to complete the geologic map. Intensive field work was terminated August 3, 1933, but routine observations on wells and springs are being continued by W. C. Mason and C. E. Douglass, cooperative observers representing the Umatilla County Court and the Washington Department of Conservation and Development, respectively.

[fol. 113] The term of the investigation—a year beginning with the preliminary reconnaissance and only three months coordinated study in the field—has permitted observations of the behavior of the surface water and ground water through only a part of one annual cycle. Thus, only tentative conclusions are drawn as this preliminary report is being prepared (August-September, 1933). These conclusions can be tested only by systematic observation of critical hydrologic features during a term of years.

Acknowledgments

The writers acknowledge with gratitude the cordial cooperation of the residents of the basin, without which little could have been accomplished. Commendable service was rendered by the following persons who, without compensation, kept records for several months from float gages installed in their wells: E. C. Babcock, Sam Givens, O. K. Goodman, D. Goodwin, U. H. Hayden, Walter Herman, Louis Howton, John Irons, J. D. Knobel, John Pitman, Alpha Reese, A. A. Durand, A. L. Ebersol, and Haig Brothers, well drillers, contributed records of wells drilled by them, and discussed the conditions pertaining to the occurrence of ground water in the Walla Walla Basin.

[fol. 114] The Water Resources Department, of Oregon, and the Department of Conservation and Development, of Washington, have contributed freely of their data gathered in other investigations in the area and have co-operated with the Geological Survey to establish a coordinated program of observations which would meet the needs of each agency without duplication of effort. The Oregon agency has been represented by E. K. Humphrey, assistant to the State Engineer; the Washington agency by Dr. J. G. Woodburn of the Washington State College, and by C. E. Douglass, hydrographer. The assistant watermaster, Mr. Mason, has contributed freely from his intimate knowledge of the district about Milton and Freewater and has rendered competent assistance in the field.

[fol. 115] Climate

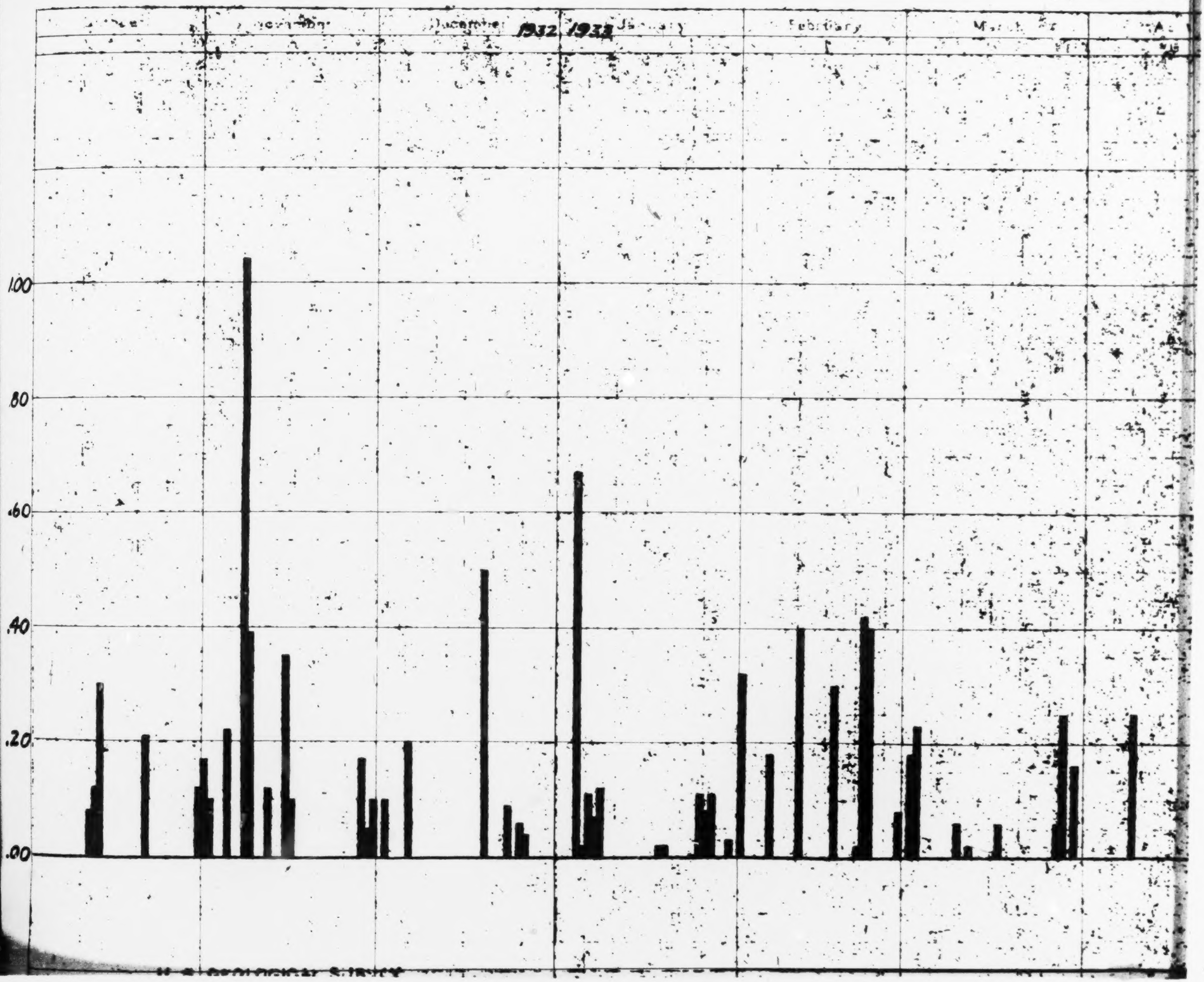
The Walla Walla Basin has a semi-arid climate, with warm dry summers and cold wet winters. At Milton the mean temperature in the warmest month, which is generally July, is 73.9° F.; in the coldest month, which generally is January, it is 31.0° F. The mean annual temperature is 52.6° F. In the 11-year period 1922–1932 the highest recorded temperature was 107° F., and the lowest —15° F. In this same period the latest killing frost in the spring has ranged from March 9 to May 9; the earliest killing frost in the autumn has ranged from September 21 to November 12. The average growing season or frost-free period is 193 days.

As the following table shows, the average rainfall at Milton in the climatic year (October 1 to September 30) during the 11-year period 1922–1932 is 12.99 inches, of which 1.54 inches falls during the three summer months (July to September). The daily rainfall (or snowfall) at Milton in the climatic year 1932–33 is shown on an accompanying diagram (fig. 2).

Figure 2.—Rainfall at Milton, Oregon, 1932–33.

(Here follows 1 photo, side folio 116.)

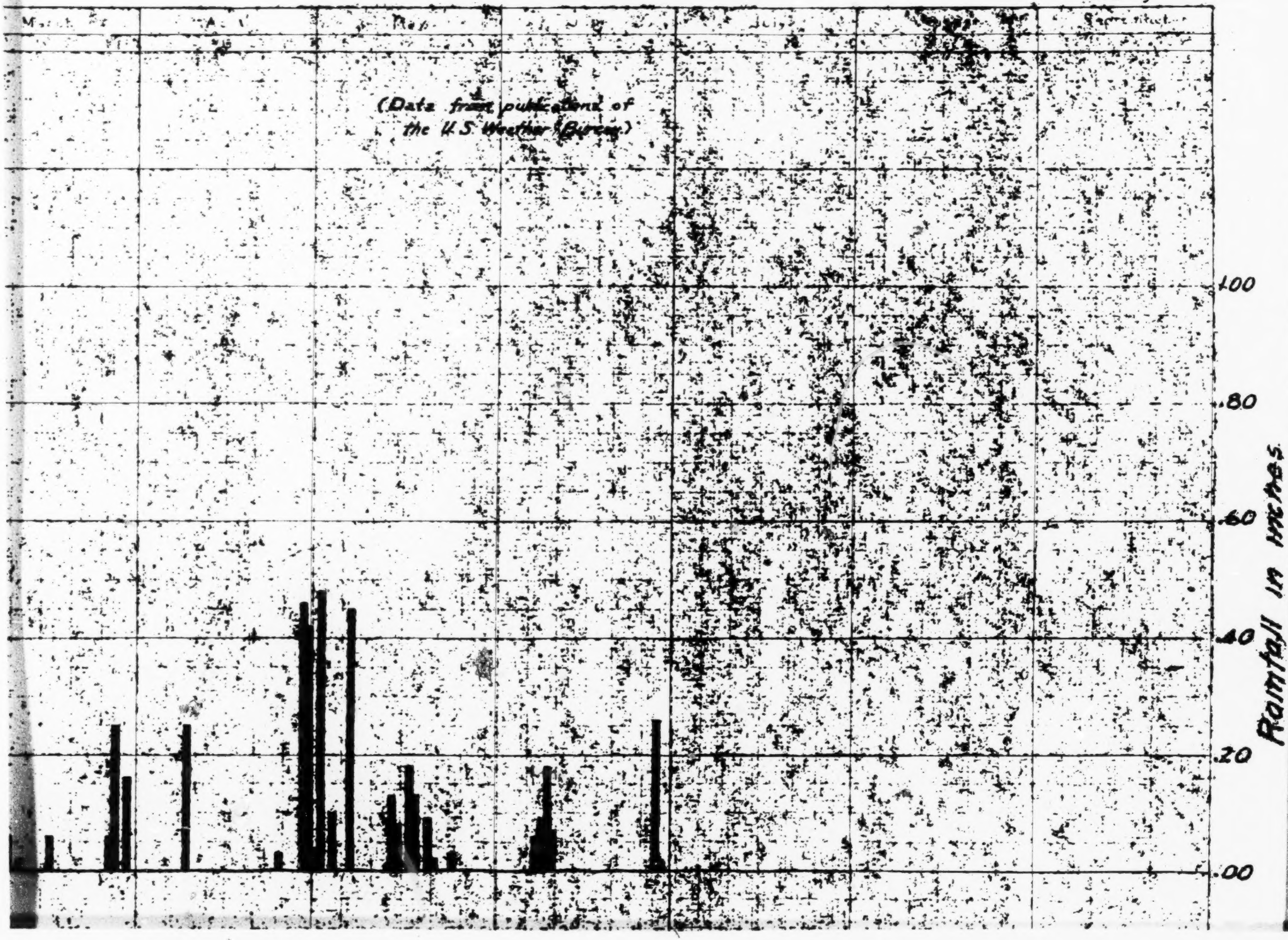
DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY WATER RESOURCES BRANCH HYDROGRAPH



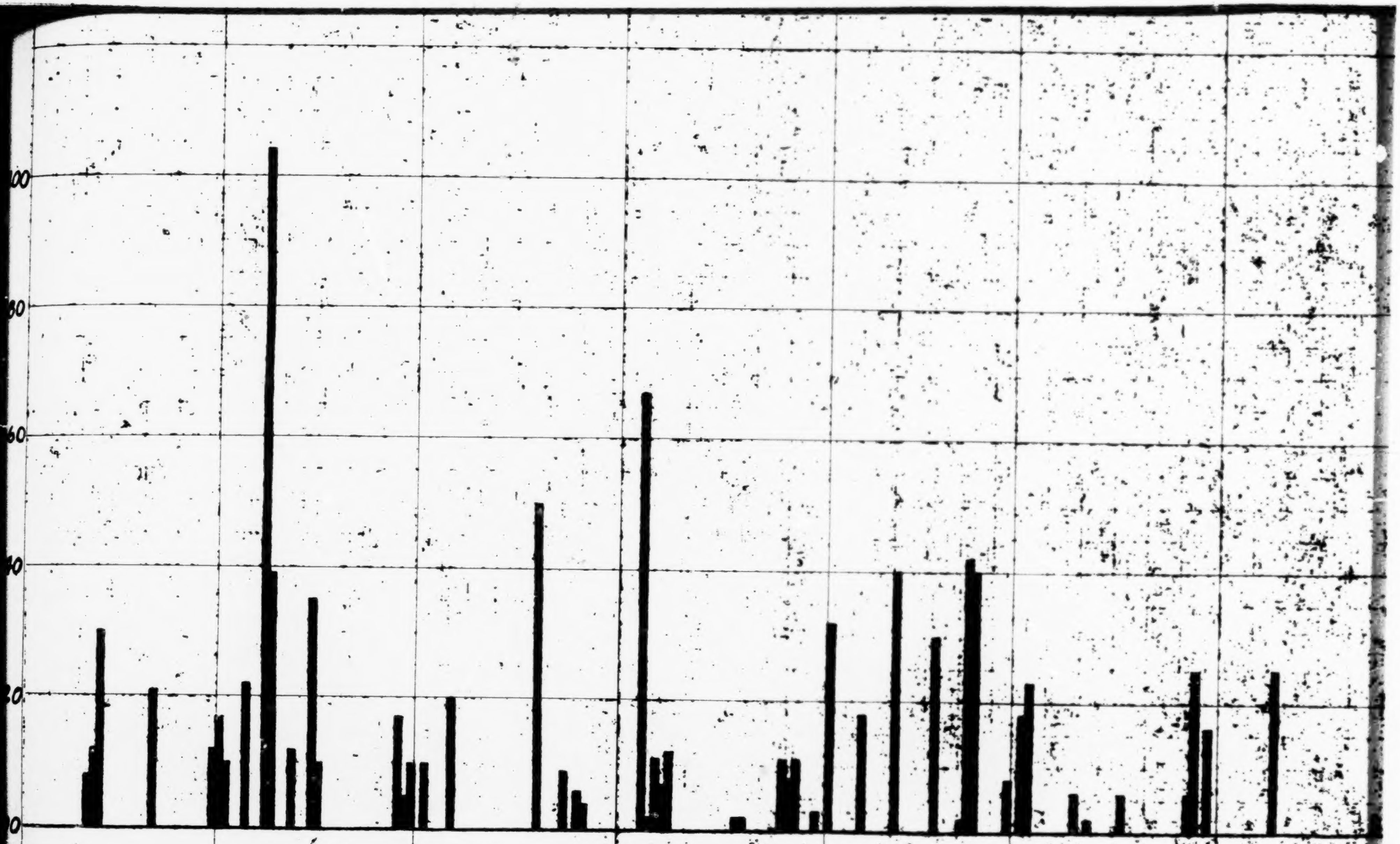
HYDROGRAPH FOR Rainfall at Milton, Oregon 1932-33

Washington

File. Figure 2



(Data from publications of the U.S. Weather Bureau)



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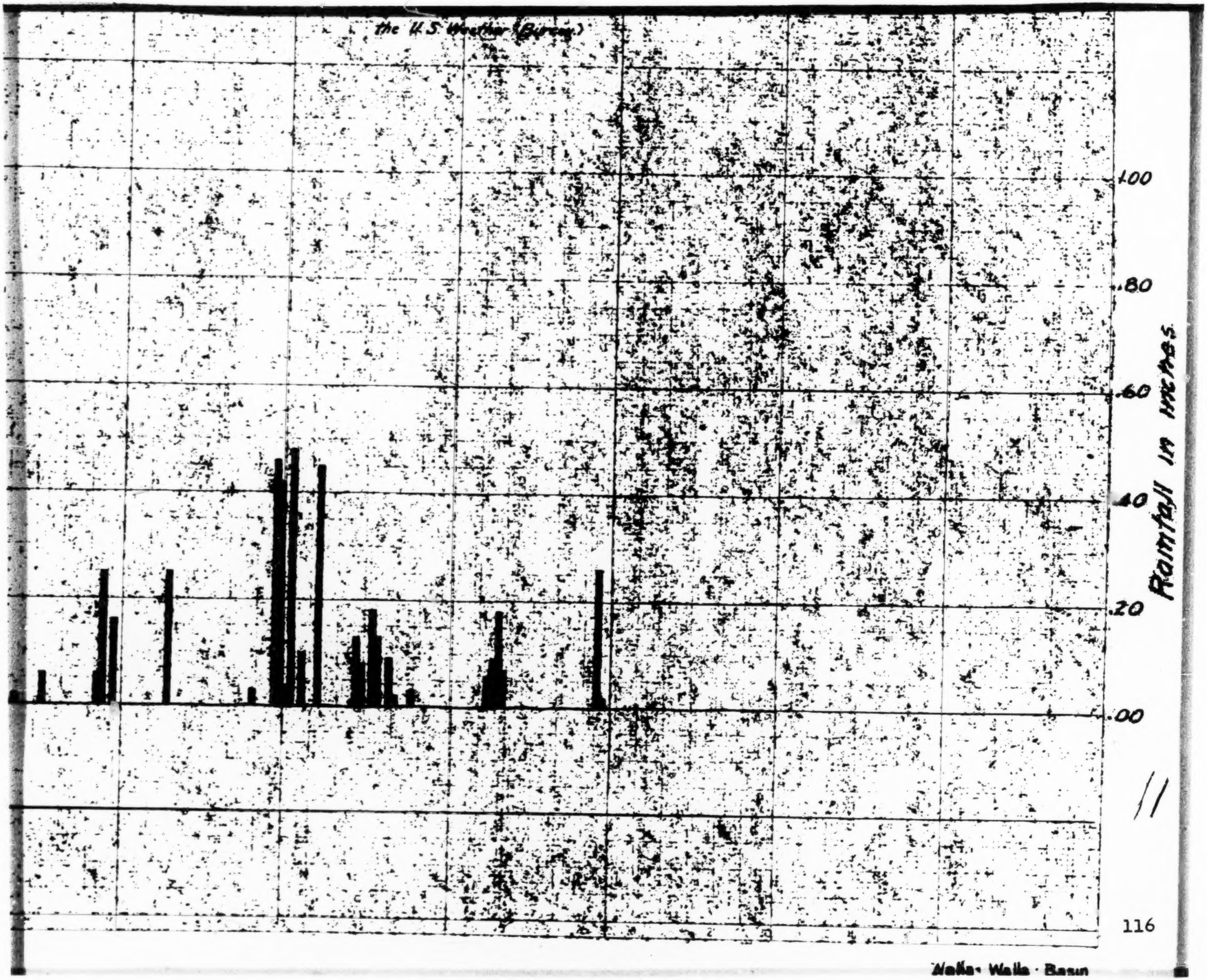

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fol. 117]

Monthly and Annual Rainfall at Milton, Oregon, 1922–1933*

Year (Oct. 1 to Sept. 30)	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1921–22	0.55	4.14	1.29	1.06	0.73	0.44	0.85	0.26	0.74	0.02	1.00	0.20	11.28
1922–23	.63	.73	2.19	.87	.60	.00	.55	1.14	1.82	.16	.81	.21	9.71
1923–24	2.75	.55	.99	.68	2.04	.69	.10	.01	.70	.45	1.05	.82	10.83
1924–25	.95	2.92	1.66	.83	.86	.79	1.20	2.27	.27	T	.47	.33	12.55
1925–26	.12	.96	2.36	1.65	2.59	1.17	1.05	1.42	1.26	T	1.41	1.06	15.05
1926–27	1.83	4.39	1.25	3.49	2.19	1.47	.26	.88	2.36	.10	.34	4.64	23.20
1927–28	1.19	2.37	.08	2.11	.27	1.72	1.06	.03	.61	.58	.09	.88	10.99
1928–29	1.16	.79	1.42	3.75	.00	1.00	.38	.97	1.96	T	.05	.58	12.06
1929–30	.43	.23	3.17	.79	1.04	.56	.93	2.47	.66	.05	.07	.91	11.31
1930–31	1.98	1.65	1.08	1.63	.86	2.66	1.08	T	1.44	.00	.00	.25	12.63
1931–32	1.18	2.15	2.43	1.12	1.11	2.11	.97	1.57	.23	.40	T	T	13.27
1932–33	.83	2.81	.99	1.41	2.12	1.02	1.16	1.73	.68	.00	....	....	.....
Average	1.16	1.90	1.72	1.63	1.12	1.15	0.58	1.00	1.10	0.16	0.48	0.90	12.99

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* Data from publications of the U. S. Weather Bureau.

[fol. 118]

Land Forms and Drainage

General Features

The area considered in this report lies in the central-eastern part of the Walla Walla plateau section of the Columbia Plateau physiographic province. The western edge of the adjacent Blue Mountains section is about 10 miles east of the city of Walla Walla. Within this area the Walla Walla plateau has moderate relief, ranging from 1,900 feet along the flank of the Blue Mountains to 400 feet in the river bottoms at the western edge of the area. The topography of the region is mature: the only extensive flat areas are the flood plains and terraces developed by the larger streams. For the most part the upland areas comprise subparallel ridges trending N. 20° E., separated by V-shaped valleys which commonly are 50 to 300 feet deep. These ridges and slopes have a deep fertile soil, and are largely devoted to wheat raising.

[fol. 119] The Walla Walla River, the principal stream of the area and its environs, heads on the west flank of the Blue Mountains and enters the southeastern part of the area through a rock-walled canyon. From Milton these rock walls diverge at a wide angle which is open toward the north and west, and which incloses a broad area floored by stream deposits. Mill Creek, which also rises on the west flank of the Blue Mountains and flows westward through the city of Walla Walla to join the Walla Walla River in the central part of the area, has developed a corresponding area of alluviation which merges into that along the main stream. Thus, the Walla Walla valley—a term which is applied in this report only to the area occupied by the unconsolidated deposits laid down by Mill Creek and by the Walla Walla River—is rudely triangular, and from apices in the canyons of the two streams converges westward to the head of the gorge which begins near Reese, 20 miles to the west. Near Whitman, where the Walla Walla River and Mill Creek join, the valley is 10 miles wide; at Touchet it is about 4 miles in width.

[fol. 120]

Land Forms

The Walla Walla valley comprises three distinct physiographic divisions. In order of decreasing age these are: the Gardena terrace, whose remnants are as much as 120 feet above the flood plains of the Walla Walla River and tributaries; the low terrace, whose remnants parallel the flood plains and are commonly less than 20 feet above them; and, finally, the alluvial fans of the Walla Walla River and Mill Creek and the flood plains of the river and its several tributaries. The extent of each of these constructional forms is indicated by the areal map of the corresponding sediments (Pl. 1).

Plate 1.—Geologic map of the Walla Walla Basin, showing location of typical wells and springs.

[fol. 121] The Gardena terrace is now thoroughly dissected and is represented by numerous remnants which range in size from flats 18 miles in length to hillocks 100 yards across. The most prominent remnant lies south of the Walla Walla River in the western part of the area; upon it are situated the Gardena irrigated tracts from which this land form is named. From the highway to the north, between Lowden and Touchet, its nearly-level tree-covered surface stands out sharply against a background of rolling grassy slopes. This remnant stands 120 feet above the flood plain of the river southeast of Touchet and 40 feet above the flood plain of Dry Creek (in Oregon) 10 miles to the east. It flanks the south wall of the valley for a distance of 12 miles. The western end of this remnant forms a narrow prong which extends into the rock-walled gorge of the Walla Walla River nearly as far as Reese. Still farther downstream remnants of the Gardena terrace form narrow shelves along the sides of this gorge. It is concluded from these remnants that the outlet of the Walla Walla River basin has occupied the site of the present gorge since the beginning of the epoch in which the Gardena terrace was constructed; indeed it may have occupied that position for a much longer time.

[fol. 122] A larger remnant of the Gardena terrace lies north of Walla Walla, is 18 miles long and as much as 3 miles wide, and stands 25 to 100 feet above the flood plain. Its western part has been intricately dissected by short tributaries of Dry Creek (in Washington) and by short tributaries of the Walla Walla River. The eastern part of this remnant is clearly part of an ancient fan of Mill Creek, whose apex was near the present site of the settlement named Tracy, 4 miles upstream from the apex of the present alluvial fan. A corresponding ancient fan along the

Walla Walla River is suggested by a remnant which extends upstream to the mouth of the canyon east of Milton.

In the central part of the basin, the terrace has been thoroughly dissected by the several distributaries of the Walla Walla River and of Mill Creek, which have left long narrow remnants. In many places the summits of these linear remnants are distinctly flat and seem to preserve the initial form of the constructed terrace. Elsewhere the summits are rolling.

In general, the gradient of the Gardena terrace is slightly less than that of the adjacent flood plain. Remnants in the western part of the area are 100 to 120 feet above the flood plain and slope westward less than 20 feet to the mile; those in the eastern part of the area stand only 10 to 25 feet above the fans of the Walla Walla River and of Mill Creek; they decline westward 60 to 75 feet in a mile.

[fol. 123] The form of the Gardena terrace before it was dissected can be reconstructed hypothetically by an imaginary surface which would coincide with the extensive flat remnants and would span the present drains which are intrenched below those flats. Such an imaginary surface comprises two conical forms, which have apices in the canyon mouths of the Walla Walla River and of Mill Creek and which by mutual interference merge toward the west into a relatively flat westward-sloping plain. Thus, its reconstructed form is that of a constructed alluvial surface. The conical form of the surface is best preserved by the terrace remnant which lies north of Mill Creek between Walla Walla and Tracy (Pl. 1). Here the generalized contours of the present land surface are arcuate and concentric about Tracy[1]; they descend from 1,500 feet above sea level near Tracy to 1,000 feet above sea level due north of Walla Walla, that is, in a distance of 7 miles, or about 70 feet to the mile. The cone, or presumptive fan, whose apex is in the canyon of the Walla Walla River at Milton is poorly preserved but seems to be about 1,100 feet above sea level at Milton and to descend toward the northwest about as steeply as the cone north of Mill Creek. At the longitude of Whitman and Umapine the hypothetical surface would be nearly plane, would stand 700 feet above sea level, and would slope westward 15 to 20 feet in a mile. Still farther west the form of the surface is poorly defined but it seems to continue with about the same gradient to and beyond Touchet and Gardena. At Touchet it would be about 550 feet above sea level.

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[1] U. S. Geol. Survey, Topog. Atlas, Walla Walla quadrangle, scale 1:125,000, 1921.

[fol. 124] The low terrace is inconspicuous; it is represented by remnants which are less than a mile wide and as much as 8 miles long, and which border the flood plains. To this terrace the graded portions of several of the smaller tributary creeks are adjusted. Remnants of the low terrace are readily discernible in the western part of the area, where they are 5 to 20 feet above the flood plain. Upstream, however, they become lower and less distinct, and commonly merge into the flood plain without any topographic break. Individual remnants decline westward somewhat less steeply than does the flood plain; for small distances the two may differ in slope as much as 5 feet in a mile. In spite of this steeper gradient, the low terrace is nowhere more than 20 feet above the present flood plain in a distance of 12 to 15 miles along the river. It seems probable, therefore, that this physiographic division includes the products of several substages which are very little older than the flood plains; two such substages, one 5 to 8 feet higher than the other, have been recognized locally in the vicinity of Umapine, Oregon.

[fol. 125] The alluvial fan of the Walla Walla River slopes northward from an apex at the mouth of the rock-walled canyon at Milton, is about 4 miles long, and is about 4 miles wide along its outer margin. At its apex the fan stands about 1,070 feet above sea level; from this altitude it descends about 60 feet in a mile and stands about 850 feet above sea level along its outer margin. This feature, hereafter designated the Milton-Freewater fan, is delimited to the north and west by the upstream ends of several remnants of the Gardena and low terraces; the main channel of the Walla Walla River, locally called the Tumalum River between Freewater and the Oregon-Washington boundary, follows its eastern margin. Upstream from Milton for several miles the canyon of the river is floored by a flood plain 0.1 to 0.5 mile wide, this plain being correlative with the alluvial fan. Below the fan, the Walla Walla River and its several distributaries have developed flood plains which generally are less than 0.5 mile wide, and which are separated or bordered by long narrow remnants of the low terrace or by higher remnants of the Gardena terrace. About

2 miles west of Touchet, that is, near the western terminus of the valley, the flood plain of the river becomes discontinuous, and comprises narrow flats which floor a V-shaped valley.

[fol. 126] The alluvial fan of Mill Creek is less prominent than the fan of the Walla Walla River at Milton. This fan originates at an apex about 2 miles east of Walla Walla and is roughly delimited by Yellowhawk Creek on the south, by the main channel of Mill Creek on the north, and by several narrow remnants of the Gardena terrace on the west. It attains a maximum width of 1½ miles at Walla Walla, which is built almost entirely on the fan. Both above and below the fan, the flood plain of Mill Creek averages 0.5 mile wide. Below the fan, the several distributaries of the creek are likewise bordered by flood plains.

The flood plains of other tributaries of the Walla Walla River—the Touchet River, Dry Creek, Pine Creek, and Mud Creek—likewise have flood plains which generally are less than half a mile wide.

[fol. 127]

Drainage

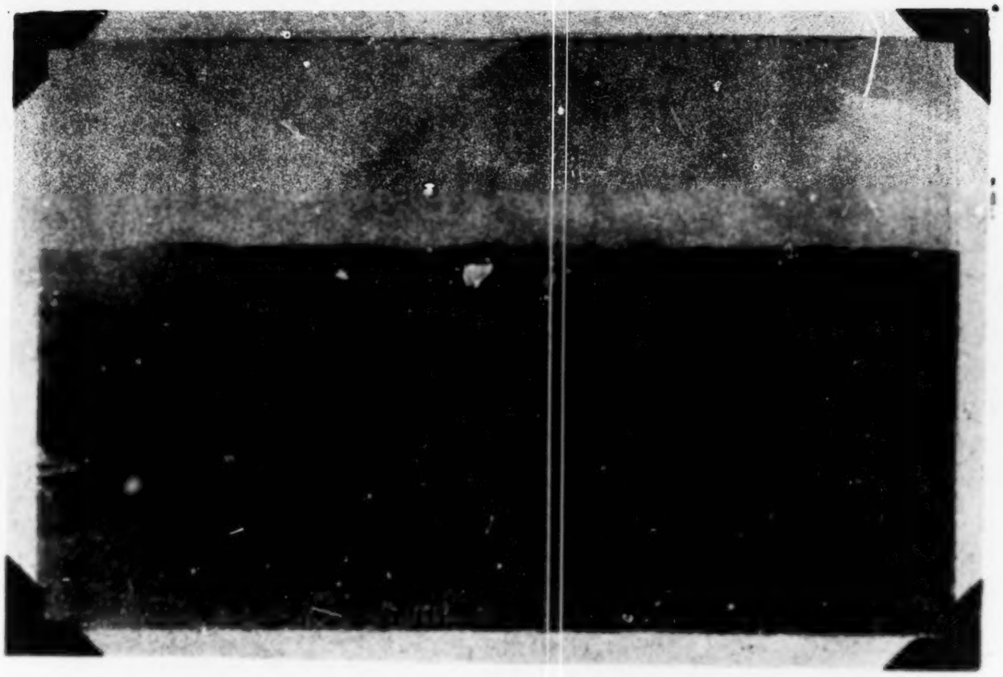
The principal stream of the region, the Walla Walla River, comprises two forks which rise in the Blue Mountains, and join about 5 miles southeast of Milton (Pl. 2, A) near the southeast corner of the area represented by the geologic map (Pl. 1). From this confluence the river continues as a braided shifting stream to Milton. North of Milton the river divides into several distributaries as it traverses the fertile Milton-Freewater fan, chief among these being the Little Walla Walla River. The Little Walla Walla River in turn divides by a complex of interlacing branches—the so-called Ford and Crockett branches—into the West Little Walla Walla River and the East Little Walla Walla River, which rejoin the main stream north of the Oregon-Washington boundary. The flow in these natural distributaries is regulated for irrigation during the spring and summer, and the number of natural channels is augmented by canals for diversion Thus, dur-

Plate 2.—A. Confluence of the North Fork and the South Fork of the Walla Walla River, 5 miles southeast of Milton, Oregon.

ing the irrigation season, most of the flow of the river is commonly diverted into the channel of the Little Walla Walla River, and continues to "The Frog" at the north edge of Freewater, where the water is distributed to the Ford and Crockett branches and to the Hudson Bay and Pleasantview canals. Possibly owing in part to this interruption of the natural regimen, the main (Tumalum) channel of the Walla Walla River is commonly dry during the summer between the railroad bridge north of Freewater and the McCoy bridge about 2 miles downstream, although several of the branches of the Little Walla Walla River continue to flow entirely across the alluvial fan. Beyond [fol. 129] the alluvial fan, however, the main Walla Walla River is perennial, its flow being replenished in part by springs (pp. 86-95). From the McCoy bridge, it courses northward about 2 miles into the State of Washington, thence northwestward about 7 miles to Whitman station, and westward to its confluence with the Columbia River at Wallula, 28 miles west of Walla Walla. Commonly it is braided, sinuous, and shifting as far downstream as Touchet and 2 miles beyond (Pl. 2, B). In its reach between the Oregon-Washington boundary and Whitman station, the river is joined from the south by its several distributaries, which are augmented by springs as is the major stream.

Plate 2.—B. View up the Walla Walla River from the bridge 4½ miles downstream from the Oregon-Washington boundary.

(Here follows 1 photo, folio 128)



A. Confluence of the North Fork and the South Fork of the Walla Walla River, 6 miles southeast of Milton, Oregon.

B. View up the Walla Walla River from the bridge 4½ miles downstream from the Oregon-Washington boundary.

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The gradient of the Walla Walla River decreases progressively downstream. At the junction of the canyons of the North and South Forks, it is about 80 feet in a mile, but across the fan north of Milton the average slope is 60 feet in a mile. At Whitman, in the central part of the valley, the slope is 40 feet in a mile and farther downstream, between Touchet and the head of the gorge at Reese, it becomes less than 10 feet to the mile.

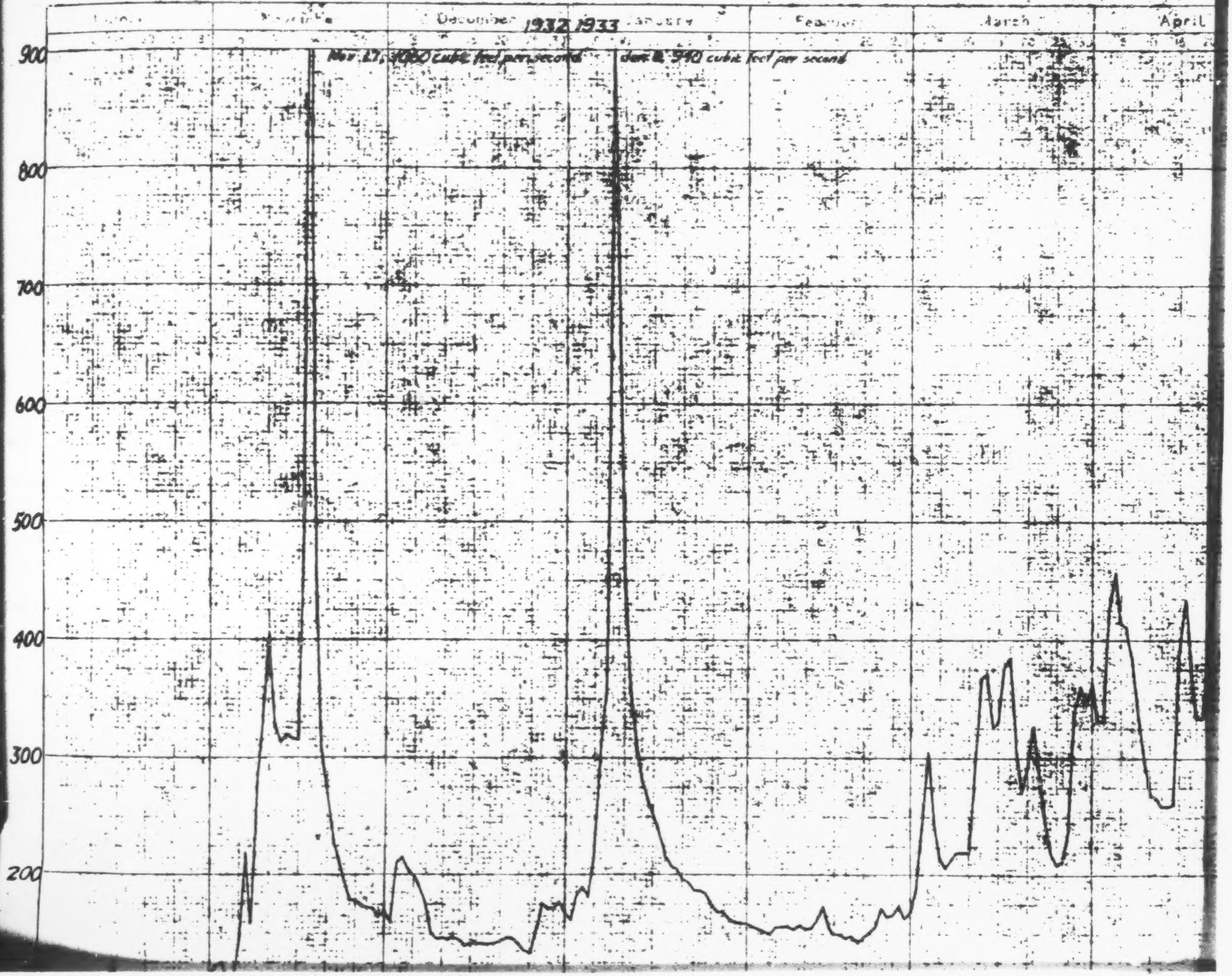
[fol. 130] The Walla Walla River drains about 150 square miles above Milton, its drainage area being moderately rugged and moderately high in altitude. Little rain falls on the drainage area in the summer and a large part of the precipitation in the winter is snow. Under these conditions the stream is subject to an annual spring freshet and is flashy throughout the year. These characteristics are illustrated by an accompanying hydrograph (fig. 3) of the combined flow in the two forks of the river in 1932-33 measured in sec. 22, T. 5 N., R. 35 E., less than a mile above their junction. Thus, although the daily discharge was commonly less than 150 cubic feet a second and exceeded 300 cubic feet a second on only 18 days of the 5-month period ending February 28, 1933, it twice rose to about 1,000 cubic feet a second but maintained that discharge less than 24 hours.

Figure 3.—Combined daily discharge of the North and South Forks of the Walla Walla River, near Milton, Oregon, 1932-33.

Mill Creek likewise rises in the Blue Mountains east of the area represented by Plate 1. It emerges from its canyon in the northeastern part of the area and, as it traverses its alluvial fan, divides into several distributaries. These include the upper reach of Yellowhawk Creek, also Stone and Garrison Creeks. Below the point at which these distributaries branch off, Mill Creek is intermittent for a distance of about 5 miles. The gradient of Mill Creek is about 100 feet to the mile at the mouth of its canyon near Tracy, 65 feet to the mile at Walla Walla, and 50 feet in a mile near Whitman, just above its junction with the Walla Walla River.

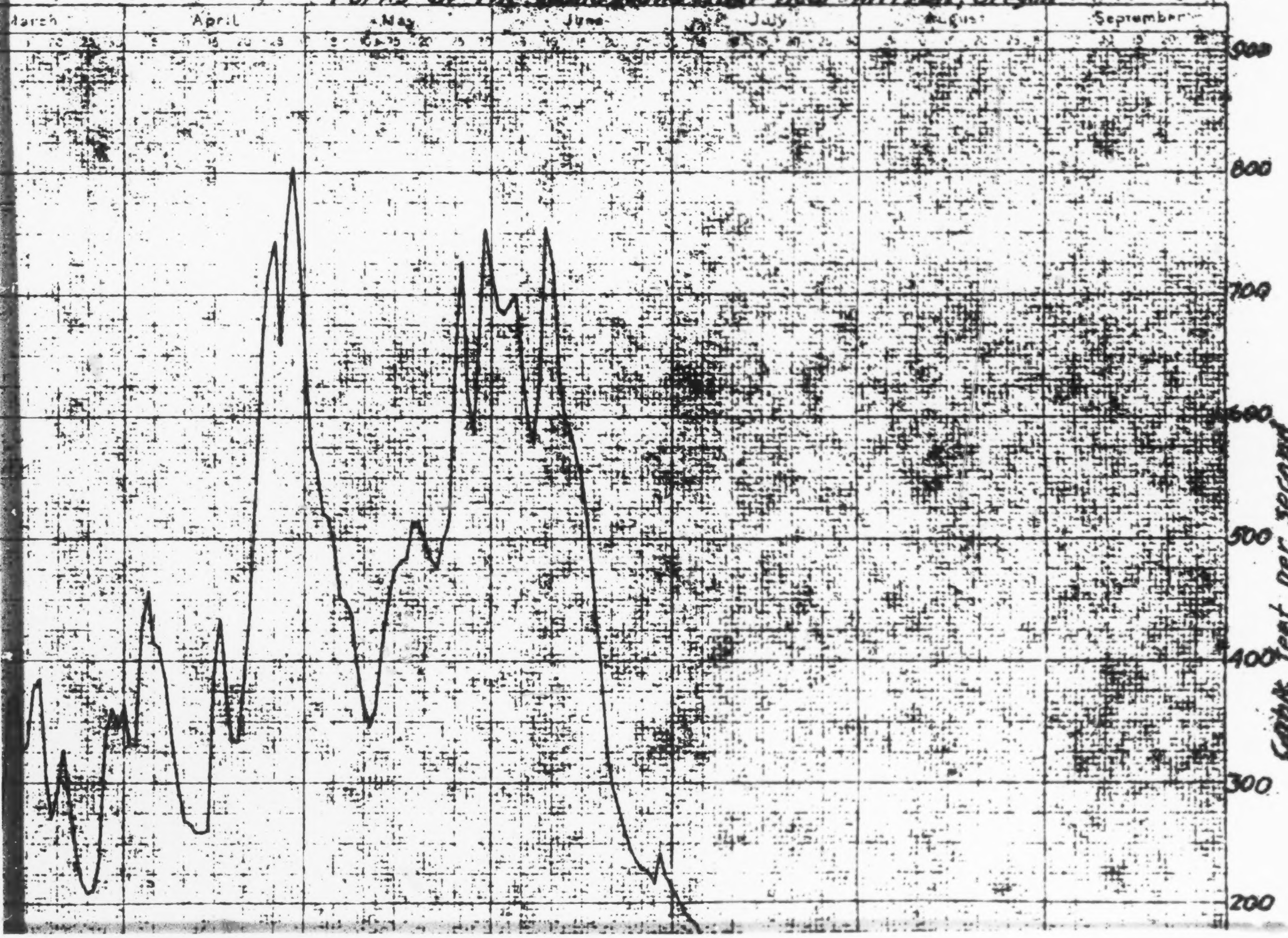
(Here follows 1 photo, folio 131)

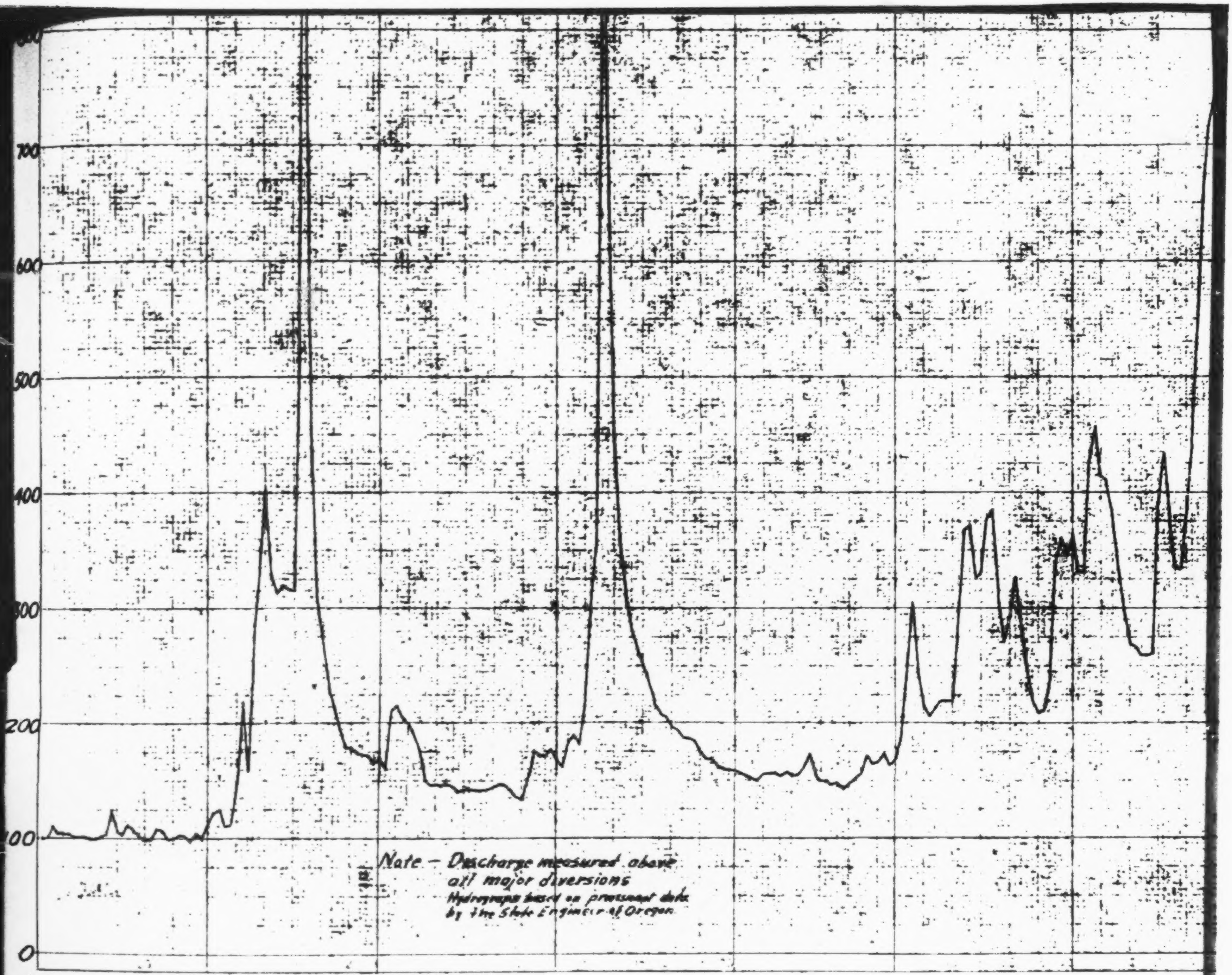
DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY (WATER RESOURCES BRANCH) HYDROGRAPH



Combined daily discharge of North and South Forks of the Walla Walla River near Milton, Oregon

Figure 3





Note – Discharge measured above all major diversions
Hydrograph based on processed data by the State Engineer of Oregon.

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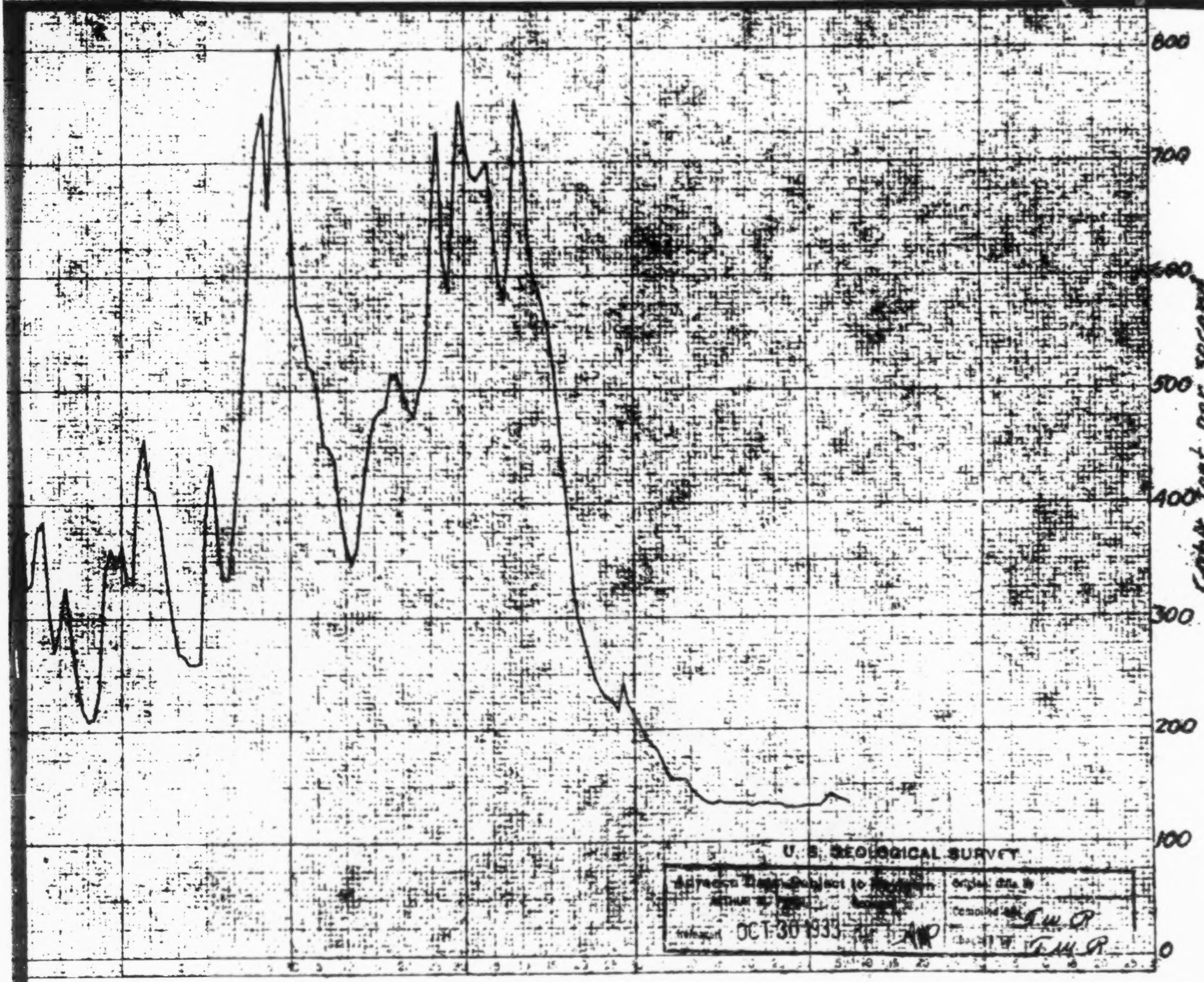

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Compiled by T.W.R.

Checked by T.M.R.

[fol. 132] Below the mouth of Mill Creek, two minor tributaries join the Walla Walla River from the south and one from the north. The northern tributary, Dry Creek, rises in the Blue Mountains east of Walla Walla, and swings north ot that city in an open curve concave toward the south; it enters the area represented by Plate 1 at its northern edge and in its lower reach follows the northern edge of the Gardena terrace. The tributaries from the south, which enter the main stream west of Lowden, are Mud Creek and Pine Creek. These streams drain the southwestern part of the valley in Oregon and Washington and also receive material contributions from springs on the Milton-Freewater fan. A major branch of Pine Creek, which is wholly in Oregon, is named Dry Creek. Like the stream in Washington which has the same name, it is roughly parallel to the margin of the Gardena terrace.

The largest tributary of the Walla Walla River, the Touchet River, lies almost entirely outside the area discussed in this report. It also heads in the Blue Mountains, flows in a rudely semi-circular course which passes 16 miles north of Walla Walla and ultimately joins the Walla Walla River in the western part of the area at the town of Touchet. Only the lower 3 miles of its course are within the area represented by Plate 1.

[fol. 133] Stratigraphy and Ground Water Conditions

General Character and Succession of the Rocks

The rocks of the Walla Walla Basin include basalt that is probably the Yakima basalt, of Miocene age, and a succession of unconsolidated sediments and stream deposits of late Tertiary and Quaternary age. The basalt is the bedrock which underlies the entire basin and its environs and which forms the Blue Mountains and the upland along its southern edge. Along the margins of the basin this rock is overlain by "loess", stratified sand, and other incoherent deposits which mantle all but the steepest slopes. These incoherent deposits along the margins of the basin are not differentiated from the basalt on the geologic map (Pl. 1). The younger unconsolidated rocks are subdivided into three units which correspond to the principal land forms of the valley, namely: the high terrace deposits which form the Gardena terrace; the alluvial deposits which form the low terrace 5 to 20 feet above the flood plains; and the young alluvium which composes the fans and the flood plains along the Walla Walla River and its tributaries. Together these deposits occupy the lowest part of the basin and are coextensive with the Walla Walla valley as that term is used in this report.

[fol. 134] Yakima (?) Basalt

Distribution, Petrography, and Structure

The basalt of the Walla Walla Basin is best exposed along the Walla Walla River west of the area represented by Plate 1, that is, from the narrows at Reese to the mouth of the river at Wallula, and in the bold cliffs farther west along the Columbia River. It is also conspicuous in the stream canyons which scar the flank of the Blue Mountains along the eastern and southern edges of the area. Elsewhere within the area considered in this report there are few exposures of the basalt, for in the uplands bordering the valley it is concealed by a thick mantle of the older incoherent sediments and in the central part of the valley is buried under unconsolidated deposits as much as 600 feet thick. A thickness of at least 1,200 feet of the basalt is exposed in the bluffs along the Columbia 2 miles southwest of Wallula. Also, well 6631K1[2] (p. 271) penetrated 1,800 feet into the basalt, and well 7429G1 (p. 273) penetrated 1,080 feet into it but neither well reached the bottom of the formation. Thus, its total thickness in the area is not known.

[fol. 135] Commonly the basalt is fine-grained, dense, and dark gray to black on fresh surfaces; in most outcrops it is divided by columnar joints and is weathered to a brown, friable residuum. Although commonly dense, the basalt contains porous vesicular layers which are encountered both in exposures and in wells. Sediments are reported to be interbedded with the basalt in two deep wells drilled near Milton. Thus, well 551B2 (p. 257) penetrated 100 feet of basalt, 41 feet of blue clay, 100 feet of basalt, and finally 17 feet of blue clay. In well 6631K1, 1½ miles northeast of well 551B2, a 17-foot bed of shale and a thin lentil of fine white gravel were encountered 217 feet and 1,190 feet, respectively, below the top of the basalt.

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[2] The number of a well indicates its location as is explained on page 108.

The Walla Walla Basin has disclosed no evidence as to the age of the basalt. No fossils have been found in the interbedded or overlying incoherent sediments, and nothing is known concerning the underlying rocks. Tentatively the basalt is assumed to correspond to the Yakima basalt of Miocene age, which is widespread in central Oregon and in south central Washington.[3]

[fol. 136] The structure of the basalt in and beneath the Walla Walla Basin is not disclosed in detail by the few outcrops of the rock but its general features are revealed by the major land forms, which seem to conform approximately to the regional structure. The major feature of the region is the down-warped Walla Walla basin, which is bounded on the southeast by the Blue Mountains uplift, on the south by an eastward extension of the Horse Heaven Hills uplift, and on the north by a block which rises very gently toward the north. The floor of this basin is defined by the reported records of 25 deep wells. These data suggest that in the deepest part of the basin, which extends from Touchet to a point on the Oregon-Washington boundary between Whitman and Umapine, the top of the basalt is below sea-level. It is also about 400 feet below the floor of the gorge which is the present drainage outlet. From the bottom of this trough the basalt rises southward to the crest of the Horse Heaven Hills anticline; the dip is 3°-4° N. 20° E. and presumably is uniform. North of the basin the summits of the highest ridges decline southward approximately 40 to 50 feet in a mile toward the axis of the downwarp. These ridges are presumed to reflect an equal slope of the basalt bedrock. In the eastern part of the Walla Walla basin the basalt rises into the Blue Mountains block, the dip being 3°-6° N. 65° W.

[fol. 137] The diastrophic history of the Walla Walla Basin is not known, but in other parts of the Columbia

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[3] Smith, G. O., U. S. Geol. Survey Geol. Atlas, Ellensburg folio (No. 86), 1903; Mount Stuart folio (No. 106), 1904. Piper, A. M., Geology and ground water resources of the Dalles region, Oregon: U. S. Geol. Survey Water-Supply Paper 659, p. 120, 1932.

Plateaus deformation of the volcanic rocks began in middle or late Miocene time and has recurred in several epochs into very late geologic time.[4] The history of the Walla Walla Basin may be equally complex. A faint suggestion that the basin may have been further deepened in very late geologic time lies in the tendency of Walla Walla River and of Mill Creek to crowd the north margins of their fans. On the other hand, this same tendency might have resulted from mutual adjustment of the two streams to a common base level. None of the terraces within the basin slope so steeply as to suggest that they have been tilted.

[fol. 138] Artesian Conditions in the Yakima (?) Basalt

The Yakima (?) basalt yields water for domestic uses outside the Walla Walla valley and supplies some of the water for irrigation within the valley. In general, water in the basalt is recovered either from discontinuous vesicular zones ("honeycomb rock" or "porous rock" of the well driller) or from fractures where the basalt is otherwise dense. Definite water-bearing strata or layers of wide extent appear not to be present in the basalt of this region.

The wells outside the Walla Walla valley are generally located in the small valleys and canyons and penetrate the rather shallow alluvium to obtain water from the underlying basalt. Several wells drilled in Dry Creek valley, including Nos. 754H1 and 7518A1, penetrate 45 to 185 feet of unconsolidated deposits, and obtain water of good quality in the upper 90 to 125 feet of basalt. On the other hand, according to A. L. Ebersol, a driller in Walla Walla, a well drilled 30 miles north of Walla Walla penetrated 1,493 feet of basalt before striking a water-bearing zone; the water is reported to have stood about 1,170 feet below the surface in this well when it was drilled.

[fol. 139] Within the Walla Walla valley, a number of deep wells penetrate the unconsolidated deposits and tap bodies of water confined in the underlying basalt; at least 35 of these are or have been flowing wells, all of which are within 3½ miles of College Place, Washington. Several wells yield sufficient water for economic irrigation. Among these, Nos. 551B2, 6525B1, 6533M1, and 6534P2 in Oregon; and 651B1, 651B2, 6510P1, and 6512P1 in Washington, are typical of those wells which have been drilled on the flood plains. Wells 6631K1 in Oregon and 651J1 in Washington are typical of those which have been drilled on the Gardena terrace. In most of these deep wells the water is recovered from porous vesicular zones—reported to be three in number—in the upper 100 feet of basalt. A. A. Durand, of Walla Walla, who drilled many of the wells, states that the deeper porous zones have progressively greater artesian pressure. In several of the wells, among which No. 7525N1 is typical, the water is confined beneath dense basalt which overlies the water-bearing "honeycombed rock"; in other wells, such as Nos. 651B1 and 651B2, gray clay at the base of the unconsolidated deposits immediately overlies porous water-bearing basalt and apparently constitutes the confining bed. Other wells in the basalt—including Nos. 644E1 and 7429G1—have such small capacity that they can not be pumped for irrigation economically.

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[4] Piper, A. M., op. cit., pp. 139-140.

[fol. 140] Of the 35 flowing wells known to be within 3½ miles of College Place, only one well, No. 6513P1, is south of the Oregon-Washington boundary. Other flowing wells would doubtless be revealed by a complete canvass of the area and several additional wells have been abandoned because they did not flow. As more wells have tapped the water confined in the basalt, the artesian pressure has gradually diminished, so that wells which once flowed perennially have ceased to flow in summer, pumps have been installed for irrigation, and many of the wells are pumped throughout the year. In 1933, only ten of the wells continue to flow throughout the year; they are used to irrigate tracts of 5 to 55 acres. Several others now flow during the winter but not in the irrigation season. According to Mr. Durand, the well on the Hansen property, No. 651J1, behaves altogether differently from the majority of the deep wells. Located on a remnant of the Gardena terrace, it has a large flow the year around, whereas wells on the lower flood plain to the north, east, and west flow weakly or cease flowing entirely in summer. Fractures approximately 100 feet below the top of the basalt constitute the source of the water in this well and no "honeycomb" zones were encountered.

The well owned by Mr. Jaussaud, No. 6510P1, taps a porous vesicular layer which is 15 feet thick and which is 520 feet below the top of the basalt. The basalt overlying this porous layer is dense throughout. According to Mr. Durand the well supplied 2,000 gallons a minute when first drilled.

[fol. 141] Incoherent Deposits Older Than the Gardena Terrace

The incoherent deposits which mantle the basalt on practically all the slopes which rise above the Gardena terrace include four distinct types; these are "loess", unstratified pebbly silt, stratified sand and silt, and coarse cobbles and boulders. Though locally the distinctions between them are obvious, the four are too poorly exposed to have been discriminated systematically during the brief term allotted to the geologic mapping. Accordingly the relation of one to another is not known.

By far the greater part of the area which is mantled by undifferentiated rocks (Pl. 1) has a deep soil over which a dust mulch 3 to 6 inches thick is developed by summer fallowing. This is the so-called "loess". The best exposure of the material which underlies this "loess" soil is in the prominent 100-foot bluff which forms the south bank of Mill Creek 2 miles east of Walla Walla, in sec. 23, T. 7 N., R. 36 E., and which rises to altitude 1,250 feet. The upper 25 feet of this bluff exposes massive unstratified silt. Most of the lower part of the slope is smooth and grass-covered, but scattered exposures of silt occur there as well. All the exposed silt is homogeneous, buff-colored, and contains numerous calcite veinlets and minute cavities and tubes suggestive of borings and root casts. Similar homogeneous and unstratified silt is exposed in many shallow road cuts throughout the area of undifferentiated rocks. The absence of stratification and of coarse particles in much of the silt suggests that it may have been accumulated by wind, and is therefore loess. The absence of quartz and the presence of basalt and its decomposition products suggest that the silt was derived from basalt.

[fol. 142] Pebbly silt, buff, massive, and unstratified, is well exposed in a roadcut in the SW ¼ sec. 28, T. 8 N., R. 36 E., at altitude 1,050 feet. In the matrix of this silt are embedded both angular and rounded fragments, pebbles, and cobbles of basalt with no obvious sorting; here and there occur pebbles of granitic and other crystalline rocks foreign to the drainage basin of the Walla Walla River.

Many of the basalt particles are fresh, but some are much weathered. This pebbly silt, like the fine-textured loess, is common throughout the area of undifferentiated rocks. Bretz[5] considers the pebbly silt to be "reworked loess", and implies it to be a product of the "Spokane flood" in the Columbia River and to be broadcast throughout the region at altitudes less than 1,100 feet. Except for the hills south of Mill Creek which have been described in the preceding paragraph, nearly the entire area considered in this report is below the 1,100-foot contour. However, the few clear exposures of these sediments in the small Walla Walla basin neither affirm nor refute the hypothesis formulated by Bretz.

[fol. 143] The stratified sand and silt is known to occur in only one part of the area, its northwestern corner, where it overlies the basalt above the Gardena terrace. Along the new highway in secs. 29 and 30, T. 7 N., R. 33 E., there are several excellent exposures of this material, and the underlying basalt crops out in several places along the floor of a gully less than 100 yards to the north and up to altitude 550 feet. This incoherent deposit comprises well-stratified sand and silt in beds 6 to 18 inches thick. Each bed is composed at its base of coarse gray sand commonly cross-bedded, and grades upward to very fine buff sand and silt at the top; the contact between beds is everywhere sharp. Generally the beds are horizontal, but in some places are contorted or faulted on a minute scale; this deformation would seem to be due to local failure of the weak sediments during their compaction and subsequent dissection. Contemporaneous dikes of sand and silt 1 to 24 inches thick transect the bedding and are commonly much contorted and faulted. Locally the stratified sand and silt inclose small lenticular or irregular pockets of gravel and small cobbles; most of these particles are of basalt but a few are of granitic and metamorphic rocks. Lithologically these sediments are almost identical with the well-stratified sediments which form the Gardena terrace (pp. 40-45). However, the highest of these sands form a flattish area at altitude 650 feet—fully 200 feet above the remnants of the Gardena terrace 2 miles to the south and separated from those remnants by a distinct geomorphic boundary. Locally a mesa of basalt 100 to 200 feet high borders this flat surface to the north, and a small knob of basalt separates it from the present channel of the Walla Walla River. Thus there lies in the present topography a suggestion that these [fol. 144] stratified sediments—and possibly the coarse cobbles near the eastern end of the gorge west of Touchet—fill a former stream channel between the Walla Walla Basin and the Columbia River. However, if such a channel has existed it would seem to have been grossly tilted and deformed. Obviously, a search in the field for evidence pertinent to this problem lay beyond the scope of this investigation.

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[5] Bretz, J. H., Valley deposits east of the channeled scabland: Jour. Geol., vol. 37, pp. 513-516, 1929.

Similar stratified sand is also exposed about 3 miles farther east along the road 3 miles north of Touchet and about 50 feet above the projected level of the Gardena terrace. There the underlying basalt does not crop out. Still farther east, small outcrops of stratified coarse and fine sand occur in sec. 24, T. 7 N., R. 33 E., at altitude 550 feet. Deposits of stratified sand which stand definitely above the Gardena terrace were not found east of this outcrop.

Both the pebbly silt and the stratified sand and silt contain fragments and particles of rocks foreign to the drainage basin of the Walla Walla River; according to Bretz[6] erratic material of this sort is common in nearly all outcrops less than 1,100 feet above sea-level. The erratic material may well have been deposited initially within the Walla Walla valley in an epoch which antedated the Gardena terrace, the Columbia River presumably having transported the material during one of the glacial stages. Subsequent erosion and sedimentation in the Walla Walla Basin have left only meager and inconclusive suggestions of this postulated early deposition. If the highest erratics and uppermost beds of pebbly silt define their initial limits on the present topography, these early sediments may once have been distributed over most of the area described in this report.

[fol. 145] The coarse gravel and cobbles to which reference was made on page 37 overlie the basalt at the eastern or upstream end of the gorge of the Walla Walla River, 2½ miles west of Touchet. There in a tributary gully near the center of sec. 6, T. 6 N., R. 33 E., at least 25 feet of this coarse cobble deposit is exposed; it consists of poorly sorted, poorly stratified gravel, cobbles, and boulders as large as 10 inches in greatest dimension. So far as known all the cobbles and boulders are of basalt; some are rounded but many are sub-angular. Lentils of cross-bedded sand and silt are inclosed in the gravel locally and the whole is commonly compact and somewhat lithified by calcareous cement. Half a mile to the east, at the same altitude, a similar cobble deposit is exposed in a railroad cut. The uppermost cobbles in these exposures are very little above the level of the Gardena terrace south of the river, but the top of the hill along whose slope they crop out is nearly 50 feet above the projected position of the terrace. Accordingly, these coarse deposits are included tentatively among the sediments older than the Gardena terrace.

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[6] Bretz, J. H., op. cit.

The unconsolidated sediments older than the Gardena terrace—the massive loess, the pebbly silt, and the stratified silt and sand which collectively mantle the basalt—are generally fine-textured and presumably are not highly permeable. They are not known to yield water to any wells.

[fol. 146] Erratic Boulders of Uncertain Age

Boulders which have been transported to the Walla Walla valley from distant points were found at 44 localities in the course of the geologic mapping, but a complete canvass of the area was not made. Most of these erratics are associated with the deposits of the Gardena terrace (pp. 40-49); others accompany the deposits older than that terrace, and a few accompany the alluvium of the flood plains. All are petrographically unlike any of the rocks known to occur in place within the drainage basin of the Walla Walla River and its tributaries. A full discussion of these erratic boulders is beyond the scope of this report, but those which have been observed are listed in an appended table (pp. 100-106) because they seem to have a critical place in the ultimate unravelling of the regional geologic history. Some (locality 37, p. 105) are embedded in a compact till-like matrix which suggests rafting on floating ice as the presumptive method of transportation; certain others (localities 1 and 4) are so large that floating ice seems to be the only feasible vehicle of transportation. The localities range in altitude from 400 feet above sea level along the river west of Touchet (locality 10), to 1,025 feet above sea level on the Gardena terrace southwest of Russell (locality 35). The largest erratics are located in the western part of the valley, and the others seem to grade to the smaller sizes toward the east. This suggests that the erratics were brought in to the area from the west, that is, from the direction of the Columbia River. The age of these boulders, with respect to the conventional time scale of the Pleistocene or to the local sequence of epochs of erosion and sedimentation, is not known. They may well have been transported into the valley in more than one epoch.

[fol. 147] High Terrace Deposits (Gardena Terrace)

Lithology and Distribution

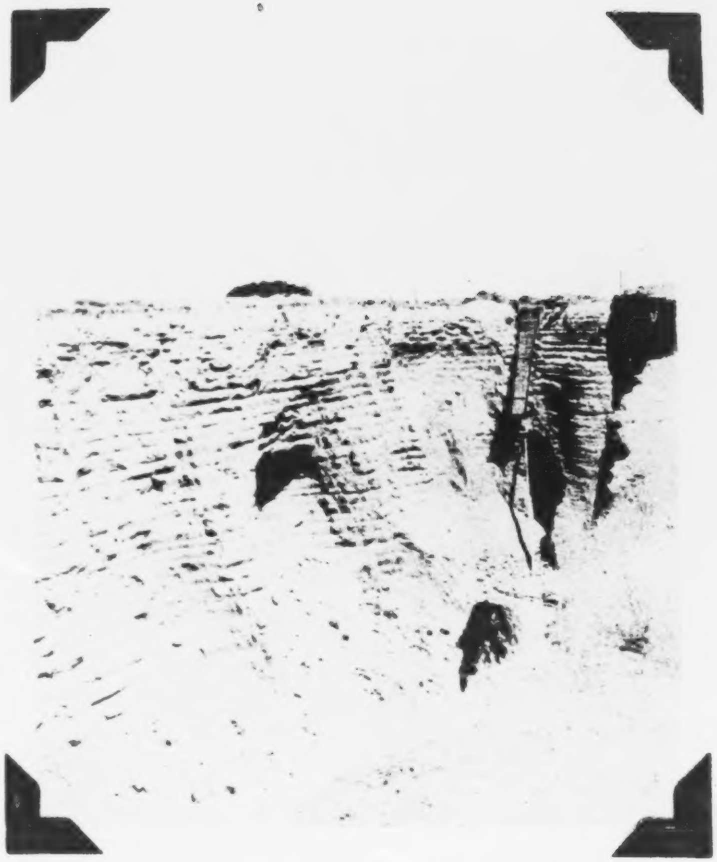
The deposits of the Gardena terrace include the sediments which compose the visible parts of the terrace, that is, above the present flood plains, as well as the concealed sediments which underlie the terrace remnants and rest on the basalt bedrock. The sediments which stand above the flood plains are mostly stratified sand and silt, which are underlain by gravel in a few exposures. Those which are concealed are known only from the records of deep wells.

The stratified sand and silt, which predominate in the exposures of the Gardena terrace in the western part of the area, are well exposed 2 miles south of Lowden in the wasteway from the Burlingame ditch. There, 28 beds are exposed, each containing cross-bedded coarse gray sand at the base, grading upward to massive buff silt at the top, and terminating sharply against the overlying bed. These features are depleted by Plate 3, A, and by two partial

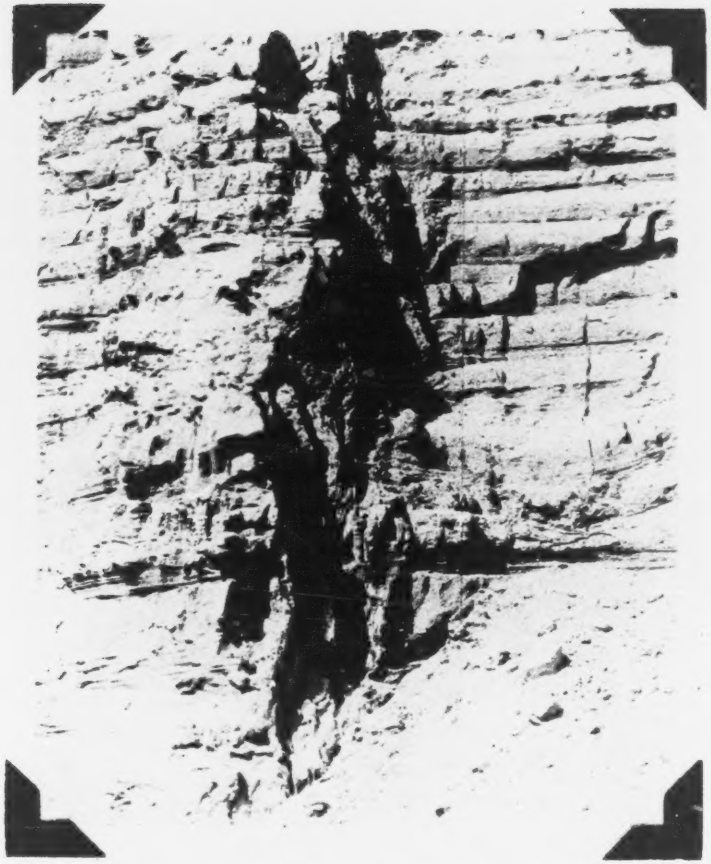
Plate 3.—A. Stratified sediments of the Gardena terrace exposed in the wasteway from the Burlingame ditch, in sec. 5, T. 6 N., R. 34 E.

sections which follow.

(Here follows 1 photo, folio 148)



A, Stratified sediments of the Gardena terrace exposed in the wasteway from the Burlingame ditch, in sec. 5, T. 6 N., R. 34 E.



B, Stratified sand and silt and compound sand dike in the deposits of the Gardena terrace.

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Advance Data-Subject to Revision ARTHUR M. PIPER, Geologist	Original data by
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Plate 8

[fol. 149] Partial Section of the High Terrace Deposits in the Wasteway of the Burlingame Ditch in the S. W. 1/4 S. W. 1/4 sec. 5, T. 6 N., R. 34 E.

Top of section is at the level of Gardena terrace, approximate altitude 580 feet.

	Feet
1. Silt, gray	6
2. Sand, well stratified: 28 distinct beds, each composed of coarse gray cross-bedded sand at the base, and grading upward to buff silt. The coarse sand ranges from 2 to 40 per cent of the thickness of the bed. The beds are 6 inches to 4 feet thick, the thinner beds in the upper part of the section. Dikes of sand and silt, 2 to 12 inches thick, transect these beds at angles of 60° to 90° and in one place, a boulder, apparently of basalt, was seen, embedded at the base of a bed	75
3. Silt, somewhat pebbly, which may be the upper part of another bed similar to but thicker than those in member 2	6
Floor of wasteway and base of measured section is debris-covered.	
Thickness of measured section	87

[fol. 150] Partial Section of the High Terrace Deposits Along the South Bank of Pine Creek, 4 Miles Southeast of the Burlingame Wasteway, in the N. W. 1/4 S. W. 1/4 sec. 22, T. 6 N., R. 34 E.

Top of section is probably a remnant of the Gardena terrace, approximate altitude 600 feet.

	Feet
1. Very fine sand and silt, unbedded, light buff	10
2. Sand, 15 beds 1 to 2½ feet thick, each with gray coarse sand at base, yellow silt to fine sand at top	28
3. Coarse sand, unstratified; lentils of pebbles less than 1 inch in diameter, blocks of silt and sandstone up to 6 inches in length	1

Partial Section of the High Terrace Deposits Along the South Bank of Pine Creek, 4 Miles Southeast of the Burlingame Wasteway, in the N. W. ¼ S. W. ¼ sec. 22, T. 6 N., R. 34 E.—Continued.

	Feet
4. Very fine sand, massive; current bedding in coarser sand near base	4
5. Coarse sand, cross-bedded, gray; basalt grains less than 3 millimeters in diameter	1
6. Silt, plastic when wet, well-sorted; discontinuous because of erosion preceding the deposition of member 5	0 to 1
Base of section is channel of Pine Creek.	
Thickness of measured section	45

[fol. 151] In their gradation from coarse particles at the base to fine particles at the top the beds exposed in these two sections are analogous to varves, but the size of the grains and the relatively great thickness of the beds are entirely unlike the thinly-laminated fine sediments which compose true varves. Moreover, the cross-bedding indicates that these sediments were certainly not deposited in quiet water, but from water moving with moderate velocity. Hence it is not obvious that the strata are annual laminations, as true varves are generally presumed to be, although the alternation of coarse and fine sand certainly indicates cyclic fluctuations in the texture of the load transported by the streams from which the sediments were deposited. In these and other exposures, the beds range from 2 inches to 4 feet thick. These stratified sediments are conspicuous in cuts along the highway west of Lowden, where wind has etched the surface by removing the particles of coarse sand. East of Lowden the stratification is commonly inconspicuous, but is brought out in numerous exposures when the finer materials are saturated with water from the spring rains; under these conditions road cuts near the Whitman Monument in sec. 32, T. 7 N., R. 35 E., and south of College Place, in secs. 1 and 2, T. 6 N., R. 35 E., show pronounced stratification.

[fol. 152] Conspicuous in many outcrops of the stratified terrace deposits there are minor faults, folds, contorted beds, and dikes of sand and silt, presumably the products of settling and compaction after the sediments were laid down. The initial stages in the development of these phenomena are well shown in the wasteway below the Burlingame ditch. Differential settling of a 2-foot bed of sand into the underlying silt caused several minute block faults across the sand bed, and the silt, evidently plastic, was forced up along several of these fractures to a maximum height of 18 inches. Other dikes of clayey silt in these deposits become narrower and finally pinch out upward. There are still other dikes which are made of coarse sand and which pinch out downward; these apparently were formed by filling fissures from the top. Compound dikes, made up of a dozen or more vertical stringers of silt and sand, are common (Pl. 3, B); they are presumed to have developed by the repeated opening and filling of a fracture during the compaction of the sediments. In places the sand which composes these dikes has a faint, nearly horizontal stratification; elsewhere it is stratified subparallel to the inclosing walls. Horizontal faults offset many of these dikes along bedding planes, the displacement being usually less than 3 feet. Other features resulting from compaction are the minute folds and contortions in the larger dikes and in the beds themselves, and the small normal faults which offset the beds.

Plate 3.—B. Stratified sand and silt and compound sand dike in the deposits of the Gardena terrace.

[fol. 153] Unstratified buff pebbly silt is of wide extent and considerable thickness in the terrace deposits. Usually 50 to 75 per cent of the grains in this facies are silt, and less than 25 per cent are coarser than 1 millimeter in diameter. Commonly the coarse fraction includes pebbles, cobbles, and even boulders, which are intimately distributed throughout the silt, and most of which are basalt—some fresh, some much weathered. However, the coarse fraction also includes many grains of quartz and some fragments of rock entirely foreign to the Walla Walla drainage basin.

Grains, fragments, and boulders of basalt and of foreign rock also occur embedded in the stratified sand. Thus, on the floor of the wasteway from the Burlingame ditch (p. 102, locality 16) there are many cobbles and boulders, both angular and rounded. Most of these are of basalt, but there are several of granodiorite, one of gneissoid granite, and one granite block 3½ feet in maximum dimension; all these presumably are residual from the stratified sand and silt which was removed in forming the wasteway. In the wall of the wasteway, a 10-inch boulder of basalt was found embedded in the coarse sand of one bed. In other localities the stratified sand incloses small lentils and pockets of unassorted sand and gravel.

[fol. 154] The stratified sand and silt form the uppermost layers of the Gardena terrace throughout the area represented by the geologic map (Pl. 1), but in general, they are thickest in the western part of the valley. Thus, at least 80 feet of silt and fine sand are exposed in outcrops south of Touchet, and a total thickness of 150 feet is reported in a well at Gardena, No. 639D1. In the central part of the valley, between Umapine and College Place, the terrace remnants stand 40 to 50 feet above the flood plains and the fine sand and silt of which they are composed extend considerably below those plains. For example, well 6512P1, located at the edge of one of the terrace remnants, penetrates only silt and fine sand though it reaches 25 feet below the flood plain. Still farther east, the well at the Walla Walla airport, No. 7615B1, penetrated only 20 feet of sand and silt beneath the terrace and then entered coarse gravel and cobbles. Near the southeastern apex of the valley, the well of the Milton Nursery Co., No. 6631K1, also passed through 20 feet of fine material and then entered gravel. Near the apices of the young alluvial fans of the Walla Walla River and of Mill Creek, the cut banks expose 3 to 18 feet of fine material resting on compact ill-sorted gravel and coarse cobbles.

[fol. 155] Coarse gravel and cobbles crop out beneath the stratified sand and silt in three localities: (1) in the bluff east of the Walla Walla River at Milton and Freewater and elsewhere about the apex of the Milton-Freewater fan, (2) along the north side of Mill Creek about the apex of its fan, and (3) in a gravel pit south of the Walla Walla River a mile south of Touchet. These coarse deposits near Milton comprise ill-sorted poorly-rounded pebbles and cobbles of basalt, generally less than 8 inches in diameter, assembled in rude beds of compact gravel. Commonly the gravel is lithified with calcareous cement in its uppermost part and is weathered and iron-stained throughout the exposures. Beds of such material inclose lentils of sand and silt, poorly stratified or unstratified and not assorted. The full thickness of the coarse sediments in this vicinity is revealed in the well of the Milton Nursery Co., No. 6631K1 (p. 271); there fine sediments 20 feet thick are underlain by gravel 180 feet thick which rests upon the basalt bedrock. The lower part of the section exposed in the gravel pit south of Touchet includes much coarse cross-bedded basaltic sand, gravel, cobbles, and even boulders (Pl. 4, A).

Plate 4.—A. Deposits of the Gardena terrace exposed in the gravel pit a mile south of Touchet, Washington.

There are also blocks of buff slightly-consolidated silt and very fine sand as much as 6 feet long embedded in the sand and gravel—silt so little consolidated that the blocks could not have been transported far or handled violently without becoming disintegrated. The pronounced current bedding and the large size of the boulders indicate vigorous currents. There are several beds of fine sand and silt in the upper part of the section. A partial section in this locality follows. Similar coarse deposits may be seen along the south bank of Pine Creek in sec. 7, T. 6 N., R. 34 E.

(Here follows 1 photo, folio 156)

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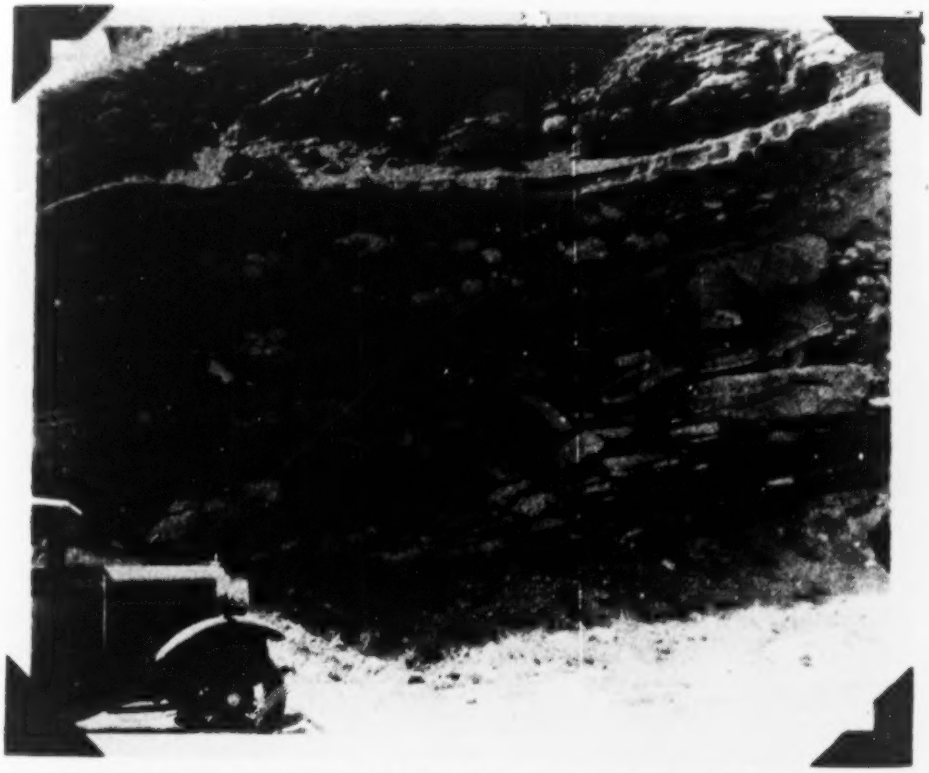
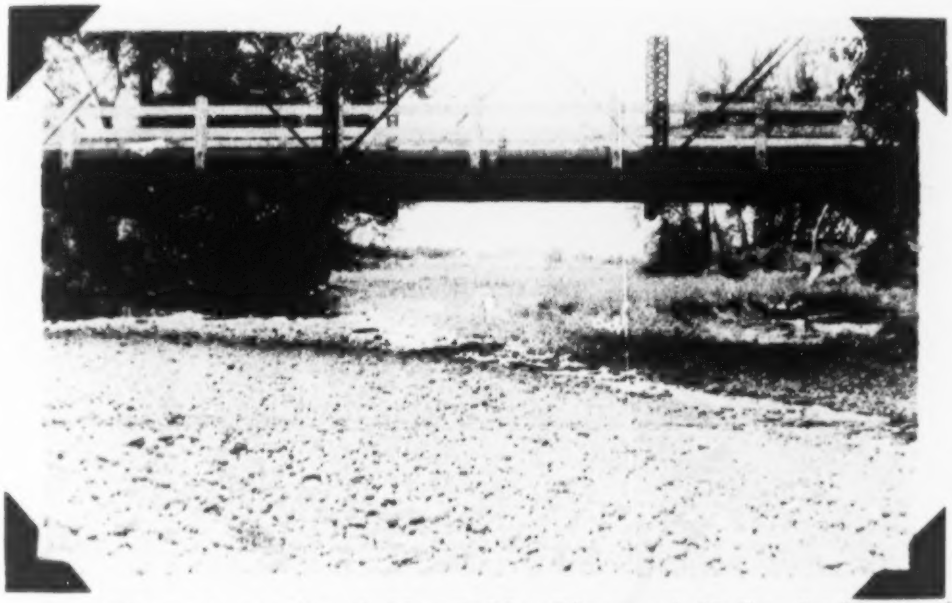


A, Deposits of the Gardena terrace exposed in the gravel pit a mile south of Touchet, Washington.



B, Channel of the Walla Walla River at McCoy bridge, in secs. 24 and 25, T. 6 N., R. 35 E., on July 29, 1933.

[fol. 157] Partial section of the high terrace deposits in gravel pit a mile south of Touchet in the NW. ¼ SE. ¼ sec 3, T. 6 N., R. 33 E

	Feet
Top of exposed section is about 50 feet below the Gardena terrace; approximate altitude 500 feet.	
1. Sand, well stratified; several beds 6 inches to 2 feet thick, each of coarse cross-bedded sand at the base, grading upward into buff fine sand and silt	15
2. Coarse sand, black, top and bottom horizontal	1
3. Sand, fine to medium, buff; grades into member 4; apparent dip 5° E.	1 to 4
4. Coarse sand and gravel, black; apparent dip 5° E.	10
5. Coarse sand, gravel, cobbles, and boulders to 3 feet in diameter, subangular to rounded; some boulders of yellow silt, nearly all others of basalt; well stratified but cross-bedded in parts; apparent dip 5° E.	8 to 5
6. Silt, buff; base and top are uneven erosional contacts	1½ to 0
7. Coarse sand, gravel, cobbles, boulders, similar to member 5	3 to 8
8. Sand, coarse to fine, gray, cross-bedded, apparent dip 5°-15° E.	2 to 1
9. Coarse sand and gravel, few cobbles and boulders, black, stratified; apparent dip of 10° E. Blocks of silt up to 6 by 2 feet, with long dimension parallel to bedding; top an erosional contact	10 to 12
10. Silt and fine sand, buff	3 to 0
11. Coarse sand and gravel, black, few cobbles; bedding horizontal, top is a very rough erosional contact	3 to 7
Base of section is road about 20 feet above the flood plain of the Walla Walla River.	
Thickness of measured section	55

[fol. 158] In other parts of the Walla Walla valley, the character of the beds in the lower part of the deposits underlying the Gardena terrace is known only from the incomplete records of a few deep wells. These report gravel, sand, and "clay" to a depth of 500 feet below the land surface near College Place and to a depth of 700 feet in well 644E1 south of Lowden.

Origin

The surface form of the Gardena terrace and its slope—70 to 15 feet in a mile toward the west (p. 18)—suggest forcefully that its topmost beds are alluvial and were deposited by the ancestral Walla Walla River and Mill Creek. Indeed several lithologic aspects favor the hypothesis that all the exposed beds of the high terrace deposits are subaerial and fluvial. Thus, unassorted gravel occurs near the mouths of the canyons at the eastern edge of the valley; the fine sediments increase in aggregate thickness and become more thoroughly assorted toward the west; and lentils and pockets of cross-bedded sand and gravel occur throughout the deposits. The repeated gradation from coarse to fine material in each stratum of these deposits indicates a cyclic fluctuation in the competence of the currents or in the size of particles available for transportation and sedimentation; a fluctuation of this sort is not necessarily incompatible with fluvial origin.

Other features favor the hypothesis that the sediments of the high terrace are largely subaqueous and possibly deltaic, though the ordinary regimen of the delta environment perhaps would not apply in the relatively small and land-locked Walla Walla Basin. It seems obvious that the sediments were not deposited in quiet water for cross-bedding is universal in legible exposures and bespeaks currents of moderate velocity. The beds which are exposed in the wasteway from the Burlingame ditch are better stratified than is common in fluvial deposits; conceivably they are subaqueous topset beds. Possibly the coarse [fol. 159] crossbedded sediments exposed in the lower part of the gravel pit south of Touchet are deltaic foreset beds, though the component material is unusually coarse for the deltaic environment. If they are foreset beds they have been overridden by the finer and nearly-horizontal beds of the topset type. However, these hypothetical foreset beds dip toward the east, which would imply that the delta was built forward from west to east, at least locally. This implied direction of advance is opposed by the westward slope of the restored terrace. Furthermore, the eastermost stratified sediments are 800 feet above sea-level, and therefore above the surface of any lake which could have been maintained by the rock barrier to the west.

Obviously, the erratic pebbles, cobbles, and boulders which are broadcast on the surface of the Gardena terrace and in the deposits which compose that terrace (pp. 101-105) bear critically on the hypotheses of origin. These erratics have been transported from far outside the Walla Walla drainage basin; presumably many of them were rafted by floating ice from the Columbia River. Some of these erratics are embedded in the sediments well below the surface of the Gardena terrace; clearly they were not transported into the basin after the terrace had been built. It is possible, however, that initially they were rafted into the basin in an epoch which antedated the Gardena terrace (p. 37) and that the terrace was built by streams which reworked the erratics with materials of local origin.

Conclusive evidence is not available to abate the dilemma created by the mutually exclusive environments of sedimentation which have been postulated in the preceding paragraphs. Both environments may have contributed to the building of the Gardena terrace, the two existing in different parts of the basin or at different times. A choice between them is intricately involved in the regional geologic history, which is beyond the scope of the present investigation and report.

[fol. 160] It is reported by Benjamin Brown, retired from the staff of Whitman College, in Walla Walla, that in July, 1933, he found an incomplete elephant tooth embedded in the unstratified silt of the Gardena terrace in a road cut at the T-intersection of the highways in the SE. ¼ sec. 2, T. 6 N., R. 36 E. This locality is about 20 feet below the initial level of the terrace and about 770 feet above sea level. Mr. Brown reports further that the lower jaw of an elephant containing two teeth was found in sand 16 feet below the surface of the terrace in excavating for the chapel at the penitentiary, at the northwest corner of Walla Walla, also that other teeth and a tusk of elephant and the femur from a camel have been found elsewhere in the terrace deposits. Specific classifications of these fossils are not available but the two genera represented suggest that the fine sediments of the Gardena terrace are of Pleistocene age, perhaps middle or late Pleistocene. The incoherent sediments which underlie the visible upper part of the terrace may well include deposits as old as late Tertiary.

[fol. 161] Water-bearing Properties

In general the fine sediments which compose the upper beds of the Gardena terrace contain much silt and have relatively little capacity to transmit ground water. In the eastern part of the area, where the Gardena terrace has been dissected into narrow elongate remnants, practically all the wells tap the highly permeable younger alluvium of the flood plains, and very few attempts have been made to recover water from the terrace deposits. In the western part of the area, however, on the Gardena irrigated tracts, the terrace deposits constitute the only source of water for domestic use. Wells of sufficient capacity must pass through the stratified silt and sand, usually 50 to 150 feet thick, and reach the coarser sand beneath. Maintenance of these wells is expensive because the pump valves are worn rapidly by the very fine sand which is suspended in the water, and because the pumping lift is large, the static level of the water being 75 to 90 feet below the surface.

[fol. 162] Even the coarse gravel and cobbles which compose the lower part of the terrace deposits locally do not yield much water; this is indicated by the small capacity of well 7615B1, deemed insufficient to supply the Walla Walla airport. However, sediments so coarse characteristically range widely in assortment, so that some gravel and cobble beds in the high terrace deposits may be highly permeable. Indeed, it may be these beds which supply some of the ground water recovered for irrigation on the Milton-Freewater fan. To be specific, the irrigation wells (p. 96) are commonly dug into the younger alluvium and are less than 50 feet deep but 26 wells are known to have been deepened by drilling in the bottom of the dug portion. The total depth of these composite wells—excepting 6533M1 and 6533M2, which penetrate into the basalt bedrock—ranges from 40 to 150 feet; the deeper ones may tap the coarse sediments of the terrace deposits.

Although the transmission capacity of the fine sediments is small, the water in the high terrace deposits seems not to be perched at any place nor to be confined under regional artesian head. Consequently there seems to exist in these deposits a simple water table.

[fol. 163] One feature in the distribution of the relatively impermeable fine sediments of the high terrace deposits is believed to control the circulation and disposal of the ground water along the outer margins of the two young alluvial fans—the Milton-Freewater fan and the Mill Creek fan. These fans, which are composed of relatively permeable young alluvium (p. 55), divide along their outer margins into tongues of young alluvium which extend outward between the remnants of the terrace (Pl. 1) and which form the flood plains of the several distributary streams. Thus, along the outer margin of the Milton-Freewater fan, the young alluvium is constricted from a width of 5 miles to an aggregate width of 2½ miles in its tongues. Further, the inner or upstream tips of the radiating terrace remnants merge with and plunge gently beneath the young fans, and the fine sediments of the terrace deposits are known to extend somewhat below the level of the flood plains in nearby wells. From these relations it is postulated that the relatively impermeable fine sediments may underlie the flood plains at comparatively shallow depth along the outer margins of the fan. Conversely, it seems likely that the young alluvium is constricted in thickness as well as in aggregate width. It is postulated finely, therefore, that the fine sediments of the high terrace deposits are so distributed about the inner tips of the terrace remnants as to reduce materially the aggregate capacity of the young alluvium to transmit ground water. Thus, it is tentatively concluded, a barrier to the circulation of the ground water is created, the water table is materially flattened above the barrier (pp. 67-68), and a fraction of the ground water is forced to the surface through the inner zone of springs (p. 89) as it passes over the barrier. An analogous condi-[fol. 164] tion along the outer margin of the Mill Creek fan is suggested by the springs which exist above the small terrace remnants within the city of Walla Walla.

Low Terrace Deposits and Young Alluvium

Lithology, Distribution, and Source

The low terrace deposits, as the name implies, comprise the sediments which form the inconspicuous low terrace and the beds of the creeks which are adjusted to that terrace. There are few exposures, chiefly in ditches dug for road drainage or for irrigation, and usually less than 5 feet deep. In most of these exposures the low terrace deposits are composed of well-assorted sand and silt, in massive beds; in some exposures they include pebbly silt. Thus, in the SW. 1/4 SW. 1/4 sec. 27, T. 7 N., R. 34 E., angular chips and poorly rounded pebbles of basalt are scattered unevenly through unstratified silt. Nowhere was gravel seen either in the exposures of the low terrace deposits or upon the low terrace. The thickness of the deposit and its character below the surface are known only from the records of four wells which are dug or drilled on the low terrace. These are Nos. 6521N1, 6528H1, 6530J2, and 7334K1 (pp. 262-272). Each of these wells penetrated silt and fine sand to a depth of 12 feet below the terrace and then entered gravel. In well 7334K1 the fine sand and silt rested directly on the thick body of gravel which seems to fill much of the Walla Walla Basin below the present stream beds. A well at Mud Creek school, in sec. 5, T. 6 N., R. 34 E., was drilled in the low terrace deposits and penetrated 60 feet of fine sand and silt before it entered gravel. However, this well is [fol. 165] situated at the edge of the Gardena terrace, a position which suggests that much of the sand and silt was part of the high terrace deposits. The bottom of the low terrace deposits is set, somewhat arbitrarily, at the base of the silt and fine sand; thus restricted, the deposits are probably not more than 20 feet thick. Doubtless, however, part of the gravel which occurs beneath the sandy silt is also a product of the epoch which culminated in the low terrace.

[fol. 166] The young alluvium comprises the sediments which form the flood plains and alluvial fans of the Walla Walla River and its tributaries. These sediments are exposed in several gravel pits and in the banks of the river channel, which is cut 6 to 12 feet below the flood plain. The young alluvium is generally of coarse texture. Above Whitman the flood plains of Mill Creek and of the Walla Walla River and their tributaries are floored predominantly with coarse gravel and cobbles which are coarsest about the apices of the respective fans. For example, in a gravel pit along the Mill Creek road just east of Walla Walla, in the SE. 1/4 SE. 1/4 sec. 16, T. 7 N., R. 36 E., the young alluvium is exposed to a depth of 15 feet. There it is composed of coarse basalt pebbles and cobbles, subangular or poorly rounded, mostly less than 8 inches in diameter, rudely shingled, and commonly embedded in a matrix of sand and silt. There are a few boulders as large as 16 inches in diameter. The gravel on the Milton-Freewater fan is likewise coarse, unassorted, and poorly stratified. Downstream from these localities, the alluvium exposed in cuts on the fans and flood plains become- progressively finer. Thus, a gravel pit on the flood plain of the West Little Walla Walla River 2 miles northeast of Umapine, in the NE. ¼ NE. ¼ sec. 18 T. 6 N., R. 35 E., exposes a 2-foot layer of reddish-buff sandy and pebbly silt overlying 14 feet of unassorted coarse basalt gravel and cobbles with a matrix of silt and sand. There the largest cobbles are 8 inches in diameter. About 14 miles farther west, in the bank of the river channel south of Whitman, in the SW. ¼ NW. ¼ sec. 31, T. 7 N., R. 35 E., the upper 7 feet of the young alluvium comprises buff and gray sand, of fine and medium texture. Beneath this sand there is exposed 5 feet of basalt gravel and cobbles, iron-cemented, the largest cobbles being about 4 inches in diameter. Still farther west, the flood plain of the river 3 miles west of Whitman is underlain by [fol. 167] medium sand 2 to 5 feet thick, which overlies 4 to 2 feet of gravel composed of pebbles less than an inch in diameter. About 2 miles west of Touchet, the channel bank consists of 12 feet of very fine sand and silt in massive beds.

The thickness and character of the sediments which underlie the flood plains at depth are indicated by the records of wells 6523F1, 6533L1, 6534P3, 6533M1, 7525N1, and 7630L1 (pp. 263-276). Nos. 6533M1 and 6534P3, on the Milton-Freewater fan, penetrated gravel to depths of 230 feet and 280 feet, respectively. No. 7525N1, on the Mill Creek fan, penetrated gravel to a depth of 165 feet below the surface. What fraction of these thick deposits of gravel is the product of the present epoch of sedimentation and what fraction is the product of an earlier epoch or epochs is wholly conjectural.

The low terrace deposits are discriminated from the older or high terrace deposits of the Gardena terrace on the one hand and from the young alluvium on the other by lithologic differences and by topographic position. In the western part of the area, they are discriminated from the deposits of the Gardena Terrace chiefly by their topographic position, in low terraces along wide valleys eroded deeply into the Gardena terrace. In texture and color, and other physical characteristics the sediments of the two deposits are similar; they are dissimilar in that the poorly exposed low terrace deposits lack the stratification, the sand and silt dikes, the minute faults, and the contorted bedding which characterize the deposits of the Gardena terrace. In the eastern part of the area a possible correlative of the low terrace deposits forms a few terrace remnants which are slightly above the flood plains and little if any below the Gardena terrace. These remnants, tentatively mapped as high terrace deposits, may well be correlative with the low terrace. Several of these remnants occur within the city limits of Walla Walla (Pl. 1).

[fol. 168] From the coarse-textured young alluvium the low terrace deposits are discriminated both by their lithologic character and, in the district west of Whitman, by their topographic position. In that district the low terrace deposits stand everywhere above the flood plains, which seem to be the product of erosion that has worked headward from the upper end of the gorge at Reese. Farther upstream the flood plains stand higher and higher with respect to the low terrace. Indeed, in the eastern part of the area, the young alluvium has been built so high in the fans of the Walla Walla River and of Mill Creek that it seems to have buried the upstream ends of several remnants of the low terrace and may now be burying them even deeper. Thus, in places it was difficult to trace precisely the boundary between the two sedimentary deposits and recourse was taken, somewhat arbitrarily, to the discrimination of the soil types[8] to fix the boundaries on the geologic map.

[fol. 169] Certain minor tributaries, such as Cottonwood and Birch Creeks, south of Walla Walla, are still adjusted to the low terrace, and their flood plains stand above the contiguous flood plains of Yellowhawk Creek and of the Walla Walla River respectively. Likewise, the flood plain of Doan Creek is adjusted to the low-terrace stage of Mill Creek, so that in the SW. ¼ of sec. 33, T. 7 N., R. 35 E., it stands terrace-like, 10 feet above the flood plain of the Walla Walla River in the gap between two remnants of the Gardena terrace. Complete discrimination of the young alluvium from the low terrace deposits in these places was not undertaken for lack of time.

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[8] Powers, W. L., and Youngs, F. O., Relative duty of water classification of lands under the Walla Walla River and tributaries, Umatilla County, Oregon: map (unpublished), 1932.

The small relief between the low terrace and the flood plains, together with the present adjustment of many of the minor tributaries to the low-terrace stage, all suggest that there is only a slight difference in age between the young alluvium and the low terrace deposits. Both sediments are alluvial and are the product of one general epoch in which the streams first dissected the Gardena terrace and then, by alluviation, adjusted themselves to a local base level. Both may be largely post-Pleistocene in age.

[fol. 170] Water-bearing Properties

The young alluvium is relatively permeable. The wells used for irrigation have commonly been dug only a few feet below the water table, but even so most of them have moderate capacity (pp. 96-98. It is characteristic of alluvial deposits, however, that they are heterogeneous with respect to the size and to the degree of assortment of their constituent particles. Consequently, the permeability of an alluvial deposit and its capacity to transmit water are likely to range widely from place to place. This characteristic is disclosed in the gravel which forms the bed of the Walla Walla River from Milton down stream to the outer margin of the young alluvial fan. There the gravel in some spots is unassorted and the interstices between the cobbles and pebbles are entirely filled with sand and silt, so that the whole deposit is compact and presumably is not highly permeable. Elsewhere, on the other hand, the gravel is largely free of fine particles and is quite loose so that it is probably moderately or highly permeable.

[fol. 171] Generally, the ground water in the low terrace deposits and young alluvium seems neither to be perched nor to be confined under artesian head, particularly beneath the Milton-Freewater fan. Thus, the water levels in the wells—both in the shallow wells which are dug and in many of the deeper wells which are drilled in whole or in part—are accordant in any particular small district. The same conditions seem to prevail in the deposits of the Gardena terrace, certainly in the stratified sand and silt fraction and commonly in the gravel fraction which underlies it. A possible exception, however, is one well in the western part of the valley, No. 7333N1, which is drilled 275 feet deep and flows slightly from unconsolidated deposits. No other wells which tap the unconsolidated deposits of the valley are known to flow and it seems likely that this one well reaches far below the base of the young alluvium. Thus it seems that a simple water table exists.

Other features of the behavior of the ground water in the unconsolidated sediments of the Walla Walla valley are discussed at length in the following sections of the report.

[fol. 172] Water Table in the Walla Walla Basin

General Features of Water Tables

As has been brought out in the discussions of the water-bearing properties of the stratigraphic units, the water contained in the young alluvium and low terrace deposits and in the upper part, at least, of the high terrace deposits (Gardena terrace) seems to exist under a water-table condition. Under this condition the interstices in the permeable sand and gravel members are entirely filled with water up to a certain level—the water table—which ordinarily corresponds to the water level in shallow dug wells. Also, the water which is stored in the zone of saturation—that is, below the water table—is analogous to water impounded in a reservoir, for where the water table occurs in permeable rocks it is free to rise and fall as the quantity of stored ground water increases or decreases.

[fol. 173] Unlike the water surface of a reservoir, however, the water table is not a horizontal plane but is analogous to a land surface with its ridges and valleys. Commonly, this uneven form is depicted on a map by contours drawn on the water table as of some particular date; thus, the slopes of the water table from place to place are shown as on a conventional contour map of the land surface. The water in the zone of saturation is not static but ordinarily is in slow motion. In general, the ground water at any particular place moves in the direction of the steepest slope of the water table at that place. The water table beneath an area in which extensive ground-water recharge is taking place commonly stands relatively high, so that the ground water moves away from that area toward an area of discharge, beneath which the water table is relatively low. Thus, the water table beneath an area of recharge commonly forms a prominence or ridge and beneath an area of discharge it forms a depression or valley.

Where the water table occurs in homogeneous material, its rise and fall measure proportionately the corresponding amounts of water which are added to or withdrawn from storage in the permeable material. Likewise, the slope of the water table is proportional to the velocity of the ground water. Natural water-bearing materials are, of course, not homogeneous but the rise and fall and the changes in slope of the water table indicate relatively the changes in storage and velocity.

[fol. 174] Form and Depth of the Water Table

The form of the water table in the eastern part of the Walla Walla Basin is indicated on an accompanying map (Pl. 5) by contours of the water table drawn as of June 20 and August 29, 1933, based on the altitude of the water surface in 109 observation wells. On or about June 20, the date of the earlier contours, the water surface in most of the observation wells in the vicinity of Milton and Freewater was at the highest position it had held in the period beginning May 1, 1933. At that time it probably held also its highest position in the period extending back to December 1, 1932, about which date float gages were installed in nine key observation wells. By August 29, the date of the later contours, the water table had receded materially from its high position, owing in part to pumping from wells for irrigation (pp. 96-98), but it was still falling and in part of the key wells had not receded to its lowest known position, which occurred in the preceding February or March. The preparation of other contour maps to represent the form of the water table in critical positions at other times

Plate 5.—Map of the eastern part of the Walla Walla Basin, showing contours and amount of rise and fall of the water table.

of the year must await the gradual accumulation of the necessary base data.

For convenience in description, the water table of the Walla Walla Basin is divided into three segments: first, a northern segment which underlies the alluvial plains of Mill, Stone, and Yellowhawk Creeks and which is designated as the Mill Creek segment; second, a central segment which underlies the young alluvial fan of the Walla Walla River and its distributaries and which is designated the Milton-Freewater segment; third, a southern segment underlying the alluvial plain of Dry Creek (in Oregon) and termed the Dry Creek segment.

[fol. 175] Both sets of contours on the Mill Creek segment of the water table (Pl. 5) are composed of straight parallel lines which trend about S. 20° E.; thus the water table on both June 20 and August 29, 1933, was approximately plane and descended westward from 1,000 feet above sea level in the eastern part of Walla Walla to 600 feet above sea level at Whitman. In this reach, the slope of the water table decreased progressively from 65 feet in a mile at Walla Walla to about 35 feet in a mile near Whitman, a relatively steep slope among water tables in alluvial deposits. Beneath the apex of the Mill Creek fan, at the eastern edge of Walla Walla, the water table in June was about 33 feet below the land surface but farther west its depth became progressively less so that it was 14 feet below the land surface in the eastern part of College Place, and 8 feet below at Whitman. Its form and depth still farther west are not known. This segment terminates on the south, in Washington, beneath the Walla Walla River, where the contours of the water table swerve sharply toward the southwest.

The Milton-Freewater segment of the water table abuts on the Mill Creek segment on the north and on the Dry Creek segment on the south, the respective boundaries being the Walla Walla River as already described and a line which passes through Freewater and along Dugger Creek to the head of the Schwartz spring branch. On the Milton-Freewater segment, the two sets of water-table contours were essentially concentric about the apex of the alluvial fan at Milton. Thus this segment of the water table formed a rude cone which descended northward and westward from its apex to and beyond the Oregon-Washington boundary and at least as far as Whitman and Umapine. Near the apex of the cone the water table was about 1,000 feet above sea level; 8 miles to the northwest, at the edge of the mapped district, it was 400 feet lower, or 600 feet above sea level.

[fol. 176] In the Milton-Freewater segment also the slope of the water table decreases progressively from 65 feet to the mile near its head to about 35 feet in a mile between the 650-foot and 600-foot contours south of Whitman. In this segment, however, the smoothness of the water table is broken by one prominence which is postulated to be related to the distribution of the relatively impermeable high terrace deposits (Gardena terrace) and to the springs on the alluvial plain (pp. 54, 92). This is depicted by periodic profiles of the water table between wells 552B1 and 6514K1, that is, from Freewater northward along the highway to the Oregon-Washington boundary (fig. 4). Thus, from well 6526P1 northward through wells F1 and B2 to well 6526B1,

Figure 4.—Profiles of the water table from well 552B1 north along highway to well 6514K1.

the slope of the water table on June 20, 1933, was essentially constant and amounted to 44 feet in a mile. Farther north, the water table descended 21 feet in 0.1 mile to the orifice of spring 6523P12 and then continued with a slope of 48 feet to the mile. South of well 6526P1, toward the apex of the alluvial fan, the slope was approximately 65 feet to the mile. The slopes indicated by the profile would be somewhat less than the maximum gradient through any particular point, for the profile is drawn obliquely to the water-table contours. These data define a prominence of the water table whose crest occurred in well 6526B1 immediately south of the spring and stood about 13 feet above the general slope. This prominence seems to have persisted since August, 1932, and to have been most pronounced when the water table stood lowest. For example, on April 4 to 6, 1933, the water table along the line of the profile stood in its lowest known position; at that time it [fol. 178] sloped northward about 55 feet to the mile from well 552B1 to 6535K2, then steepened to at least 80 feet to the mile, and flattened to about 18 feet to the mile just south of the spring, that is, between wells 6525F1 and 6526R1. Plate 5 suggests that the water table, in its outward slope from the apex of the alluvial fan, generally flattens in this fashion immediately above the inner zone of springs and then steepens beyond. Thus, the prominence on the water table seems to be an outward-sloping arcuate terrace which extends nearly if not quite across the segment. The front of this terrace lies approximately beneath the heads of the constricted tongues of young alluvium which have been postulated on page 54. Accordingly it is presumed that the form of the water table reflects this constriction in the permeable young alluvium, the percolation of the ground water being impeded to such an extent that the water table is flattened above the barrier and is steepened beyond.

(Here follows 1 photo, folio 177)

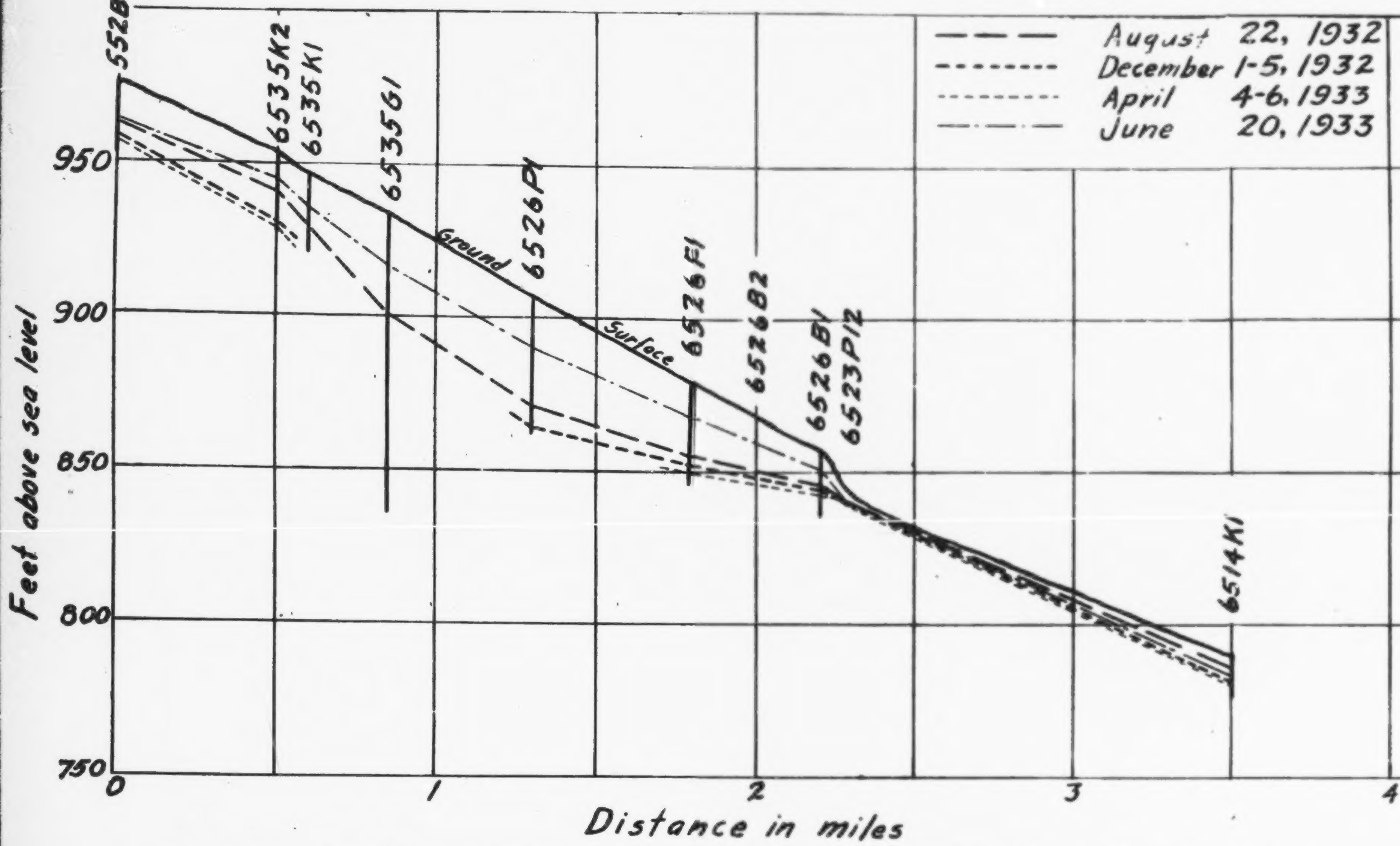

Fig. 4. — Profiles of the water table from well 552B1 north along highway

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In June, 1933, when it stood highest, the water table was 12 to 16 feet beneath the land surface above the 950-foot contour near Freewater. Toward the northwest its depth became progressively less as far as the inner zone of springs, where it intersected the land surface in many of the shallow drains. Beyond this zone of springs, the water table was generally less than 10 feet beneath the land surface. In the preceding April, however, the water table stood much lower; midway between Freewater and the inner zone of springs it was more than 40 feet below the land surface.

Little is known as to the form and depth of the water table in the Dry Creek segment. However, the sharp deflection of the 500-foot contour toward the west between South Mud Creek and the Schwartz spring branch west of Umapine, suggests that there also the form may have been conical with an apex beyond the area in which the form of the water table was mapped.

[fol. 179] Fluctuations of the Water Table, 1932--33

The water table at any point is constantly in motion, either rising or falling. The rate and amount of the rise or fall range widely at different places and at different times of the year, depending upon the position of the water table with respect to the source and disposal of ground water.

In the Walla Walla Basin, the water table has fluctuated repeatedly through a relatively wide range, even during the short term of the investigation, and especially in wells located in the higher part of the Milton-Freewater segment. The period of duration of any one cycle of fluctuation has ranged from a few days to several months, and both the brief and the extended fluctuations have ranged through several feet or even tens of feet. Fluctuations have been recognized in response to changes in the flow of the surface streams, rainfall, irrrigation in the district adjacent to the observation well, and protracted pumping for irrigation. Commonly two or more of these agencies have acted at the same time.

[fol. 180] Fluctuations of the water table in response to changes in the flow of the streams are well represented by the accompanying hydrographs for well 6525P1, owned by U. H. Hayden (fig. 7, p. 171), and for the combined flow of the north and south forks of the Walla Walla River (fig. 3, p. 24). The well is situated less than 0.1 mile west of the river channel. The flow of the river is measured above the fork and about 8 miles upstream from the well. As a result of the spring freshet, the flow of the river increased from 335 cubic feet a second to 805 cubic feet a second between April 19 and 28, and then decreased to 345 cubic feet a second on May 11. In the corresponding interval the water level in the well had risen 10.2 feet by May 5, after which it had receded 1.8 feet by May 14. After May 11 the flow in the river again increased, was continuously more than 575 cubic feet a second from May 25 to June 14, and in that period thrice rose to 725 to 750 cubic feet a second. In this interval the water level in the well rose 4.9 feet above its recession level of May 14 so that on June 6 it reached its seasonal peak, which was 13.3 feet above its low position of April 18 before the freshet began. On June 9 the freshet reached its final peak, then receded steadily. On June 21, the channel opposite the well was nearly dry, owing to the decline of the freshet and to diversions below the gaging stations; a day or two later water ceased to flow entirely. As the river declined, the water level in the well dropped rapidly and had receded 19 feet before pumping from the well began some time after July 20. Thus, the water level in the well responded readily to fluctuations in the flow of the river, though it lagged 2 to 7 days behind. The greatest lag, as would be expected, was behind the first peak of the freshet, before which the permeable members of the alluvium had drained to the lowest position of the water table.

[fol. 181] Corresponding fluctuations of the water table in this same interval occured in wells 6526B2, 6527K1, 6534B1, 6535K1, and 6536H1 as the respective hydrographs show. In these the water table rose 12 to 30 feet in response to the 1933 freshet but lagged 2 to 20 days behind the river. This lag indicates that the wave of ground water replenishment moved outward at an approximate velocity 0.15 to 0.2 mile a day. All these wells are situated below the apex of the Milton-Freewater fan but above the inner zone of springs. In wells 6526P1 and 6534P1, the water-table rose in analogous fashion, but seems to have been influenced materially by rainfall and by irrigation. In the climatic year beginning October 1, 1932, the flow of the river twice exceeded the freshet of April though only for short periods. On November 17, 1932, it attained its greatest daily discharge of the year, 1,060 cubic feet a second; on January 8, 1933, the daily discharge was 940 cubic feet a second. These fluctuations also seem to have their response in the observation wells, though the water table rose much less than in the following April and lagged much farther behind the river. Tentative correlations of fluctuations in the stream and in the wells suggest that the lag ranged from about 40 days in well 6535K1 to about 65 days in well 6534P1 and that the corresponding velocity of the ground-water wave was of the order of 0.03 to 0.05 mile a day.

Fluctuations of the water table induced by fluctuations in the flow of the Walla Walla River are further shown by the hydrograph for well 551A2 (fig. 6, p. 113), which is situated high on the young alluvial fan. Here, the total range in fluctuation is only 5.1 feet from March 2 to June 1, and the lag after the river is only one or two days.

[fol. 182] Fluctuations of the water table in response to rainfall are recognized tentatively in wells 6525P1, 6526B2, and 6526P1, especially in the latter. These are disclosed by comparison of the respective hydrographs (figs. 7, 8, 9) and of a diagram of rainfall at Milton (fig. 2, p. 11.) Thus, between December 1, 1932, and March 3, 1933, there were eight stormy periods in which more than 0.25 inch of rain fell. During this time, vegetation was essentially dormant and would not have exerted any draft upon the soil moisture. Each of these eight storms corresponds to a rise of the water level in well 6526P1, the rise lagging 3 to 5 days behind the storm. Two such fluctuations in the well are inordinately large in comparison to the others, that is, those on December 10 and January 8. These two are approximately coincident also with increases in the flow of the river and are perhaps due to the combined effects of rainfall and of stream flow. Each of the three wells whose records seem to indicate a correlation between rainfall and fluctuations of the water level are adequately curbed so as to exclude rain water from the top of the well. It is not unlikely, however, that the rainfall percolated through the soil to a moderate depth, entered the well not far below the curbing, and trickled down the walls. If this were the actual process the rise of the water level in the well might have been materially greater and much earlier than the corresponding ultimate rise of the general water table. Between March 3 and April 29 comparatively little rain fell and presumably that which penetrated the soil was quickly dissipated by active vegetation. In this period the water level in wells seems not to have fluctuated in response to rainfall. Still later, all fluctuations related to rainfall would have been entirely unrecognized because of the much greater rise in response to the spring freshet.

[fol. 183] Fluctuations of the water table produced by downward percolation of irrigation water are shown by the hydrograph of well 6534P1 (fig. 12). According to the owner and observer, John Irons, irrigation about his well began on April 2, 1933, and continued for five days until April 7. During this period the water level in the well rose 9.8 feet, or nearly 2 feet a day. Irrigation was discontinued April 7 to 16; the water level in the well receded immediately and had fallen 7.3 feet by April 13. In the next three days the water level rose about 0.5 foot, possibly part of a general rise induced by the spring freshet in the river. On April 16 Mr. Irons began to irrigate again and irrigation in that vicinity is presumed to have been general until April 29. In this period the water level in the well rose steadily except on April 18 and 25, when Mr. Irons stopped irrigating for a short time and when the water level receded slightly and temporarily. The period April 29 to May 24 was stormy and 2.61 inches of rain fell so that there was little irrigation; the water level rose 2.5 feet. After May 4 irrigation was again general and the water level rose steadily until June 26 when it stood 17.6 feet above its recession level of April 13. Though, doubtless the water table rose materially owing to irrigation in this period, it remains problematic what portion of the aggregate rise represents the general effect of the freshet in the Walla Walla River. Similar fluctuations of the water table in response to irrigation are shown by the hydrograph for well 6526P1, owned by O. K. Goodman (fig. 9), and have been observed in wells throughout the irrigated district.

[fol. 184] The fluctuations of the water level caused by protracted pumping from wells are opposed to those induced by the freshet and by irrigation. If the pumping in an area is general, the water level invariably falls in pumped and non-pumped wells alike and generally continues to fall throughout the pumping period. During the

1933 season, intensive pumping for irrigation began along the southern margin of the Milton-Freewater fan on July 5 when water was shut off from the Pleasantview irrigation ditch, which serves that district. The area of pumping spread gradually until by the end of the month it covered practically all the fan above the inner zone of springs. As the pumps were started the water table fell sharply in the nearby wells.

[fol. 185] Fluctuations of the water table owing to pumping are best illustrated by the hydrograph for well 6534P1 in July and August (fig. 12). This well was equipped with a pumping plant having a capacity of about 200 gallons per minute, which was operated constantly July 5 to 11 and July 16 to 29. Thereafter it was operated intermittently to and after the end of the period represented by the hydrograph. The hydrograph shows that on July 16 and 30, and on August 11, 21, and 25 the water level rose briefly to a peak and then declined. These fluctuations obviously resulted from intermittent pumping, the water table seeking equilibrium during the periods of idleness. A line drawn on the hydrograph tangent to the several sharp peaks of July and August would indicate approximately the lowest possible position of the water table had there been no pumping. The recession of the water table below such a line, 6.5 to 10 feet in the period July 16 to 29, is a minimum measure of the combined effect of pumping in the observation well and in other wells of the vicinity.

[fol. 186] During July and August the water table declined in all observation wells located in the area of pumping and in other wells along the edges of that area, the maximum observed drop being 28 feet in wells 6525B1 and 6525P1. However, it is uncertain that all of this decline is the effect of pumping. Thus, in well 6525P1 (fig. 7) the water level stood highest on June 6 and receded rapidly after June 21 as the freshet in the river declined. On July 10, before any irrigation pumps were started in the vicinity, it stood 15.8 feet below its highest position. The pumping plant in the observation well was operated in the late part of July but it seems that the pumping did not accelerate the recession of the water table greatly. Further, in well 6526B2 (fig. 8), in which a water-stage recorder was being operated, the water level stood highest on June 24 and receded at a nearly constant rate until it stood 4.1 feet lower on July 12; on that day the pumping plant in the well was started. Thereafter the decline of the water table was accelerated only slightly although the pump was operated continuously until August 2. Between August 5 and 10 the water level rose 1.1 feet, presumably as nearby pumps were shut down. On August 27 the pump in the observation well was shut down and the water level appears to have risen nearly if not quite to its normal position by August 28. Although on this date the water level in the well stood 8.7 feet below its high position of June 24, it seems that the decline owing to pumping may not have exceeded 2 or 3 feet at any time. In well 6527K1 (fig. 10), which is situated on the northern or lower edge of the area of pumping, the recession of the water table was accelerated somewhat after July 15, when pumping became general. However, if the rate of recession from July 1 to 15 is accepted as indicating approximately the normal rate of fall, then only a minor fraction of the decline in July and August would seem to have been caused by pumping.

[fol. 187] The net change in the position of the water table between June 20 and August 29—on account of fluctuations related to stream discharge, to irrigation, and to pumping—is indicated on Plate 5 by lines of equal rise or fall. Also, the areas which correspond to each 5-foot range in rise or fall are indicated by shading. Thus, it is shown that over most of the area represented by the map the water table fell, and generally fell less than 5 feet. However, in the Milton-Freewater segment, between Freewater and the inner zones of springs, the water table fell more than in other parts of the area, the greatest fall exceeding 20 feet and being along a line which trended N. 80° E. through secs. 25 and 33, T. 6 N., R. 35 E. Inasmuch as the lines of equal rise or fall are not contours on an actual surface they do not indicate that a depression existed in the water table beneath this part of the area in August, as might be inferred from a casual inspection of the map. Actually the water table sloped so steeply in June that the 20-foot fall merely flattened the slope locally and steepened the slope nearer the apex of the fan. This change in the slope of the water table has been mentioned on page 67 but will bear repeating. Thus, between the 850-foot and the 900-foot water-table contours along the Walla Walla River the average slope of the water table was 50 feet to the mile on June

20, and 46 feet to the mile on August 29. Farther upstream, between the 900-foot and the 950-foot contours, the slope increased in the same period from 62 feet in a mile to 96 feet in a mile. It has been postulated on page 67 that the water table had been flattened even more in April, 1933.

[fol. 188] The hydrographs for the observation wells in which float gages were operated (figs. 6-14) and the profiles of the water table northward along the highway from Freewater (fig. 4) suggest that in the district above the inner zone of springs on the Milton-Freewater fan, the water table has passed through a striking cyclic fluctuation in the year beginning in August, 1932. Thus, along the line of the profile, the general trend of the water table was constantly downward from August, 1932, until the following April, even through general pumping for irrigation ceased in August and though there intervened relatively large fluctuations which were related to fluctuations in the stream flow and possibly to rainfall. This continual downward trend of the water table also prevailed in most of the wells which were observed beginning in December, 1932. From these data the ordinary regimen of this district is postulated tentatively. First, the water table rises to its highest position as the spring freshet passes down the Walla Walla River, and as a related major ground-water wave passes outward through the permeable alluvial deposits. Second, the water table recedes rapidly as the freshet fails and as the major wave passes outward, and continues to recede more and more slowly until the next annual freshet occurs. Third, the fluctuations induced by smaller peaks in the flow of the river, by rainfall, by irrigation, and by pumping are ordinarily of secondary magnitude and are impressed upon the major cycle. This concept is somewhat obscured by the facts that extensive irrigation on the alluvial fan commonly begins as the major ground-water wave is advancing and that the distribution of surface water for irrigation commonly ends and the irrigation pumping plants on wells [fol. 189] begin to operate as the major wave recedes. Thus, it has not been possible in the brief term of the investigation to discriminate satisfactorily the rise induced by the river freshet from the rise caused by irrigation, nor to discriminate the decline associated with the passing of the freshet from that caused by general pumping. This concept does explain in a rational fashion one fluctuation of the water table that otherwise would be anomalous. Thus, in a number of wells, as in well 6526B2 (fig. 8), the water table fell 6 to 10 feet in early March, 1933, and stood relatively low until mid-April. In this period little or no rain fell, the flow of the river was relatively low, and general irrigation had not begun. Thus the opportunities for ground water recharge were at a minimum, and the minor ground water waves set up by earlier rainfall and by the November and January peaks in the stream were wholly dissipated before the major wave began. Confirmation or refutation of the concept necessarily depends upon checking the corollaries of the concept against the actual fluctuations observed in a number of key wells over a more extended term than that of the present investigation. Incidentally, if the Walla Walla River were a perennial stream entirely across its alluvial fan, it would follow from this concept that: first, the recession of the major ground water wave would be more gradual than that observed in 1933, and, second, the water table in its low position would stand materially higher in wells between Freewater and the inner zone of springs than it did in the low position observed in 1932 and 1933.

[fol. 190] Beyond the inner zone of springs in the Milton-Freewater segment and throughout its Mill Creek segment, the water table seems to have fluctuated through a much smaller range but in response to the same forces as those active above the zone of springs. In these districts the altitude of the water table was nowhere as much as 10 feet lower in August, 1933, than in the preceding June (Pl. 5) and generally was less than 5 feet lower. The least decline of the water table between these two dates seems to have been along or just beyond the inner zone of springs; there it is not known to have exceeded 3 feet. In one triangular area, which lies along the Oregon-Washington boundary line in secs. 13, 14, 23, and 24, T. 6 N., R. 35 E., the water table stood as much as 1.2 feet higher on the later date. It is problematic whether this area of rising water table represents the extreme advance of the major ground water wave passing down the Milton-Freewater fan or whether it results wholly or in part from the penetration of irrigation water. The position of the water table was observed in only a few wells in these districts before May, 1933. Thus, the data now available covers a term much too short to permit generalizations as to the usual regimen of the water table.

[fol. 191] Relation of the Water Table to the Source and Movement of the Ground Water

With respect to the source, movement, and disposal of ground water, the Mill Creek and Milton-Freewater segments of the water table were independent of one another in 1933. As Plate 5 shows, the contours on the water table coursed about S. 20° E. across the Mill Creek segment and then swerved sharply S. 55°-75° W. as they entered the Milton-Freewater segment. Accordingly, the boundary between the two segments was a well-defined trough in the water table toward which ground water was moving from the north and from the south. The axis of this trough coincided with the Walla Walla River from about the Oregon-Washington boundary westward to Whitman. It seems obvious that this relation between the two segments is essentially permanent, because each segment of the water table slopes so steeply that the axis of the trough would not be shifted materially except by a great depletion of the ground water in one segment with respect to the other. The relation of the Milton-Freewater segment to the Dry Creek segment, which it adjoins on the south, is not known.

[fol. 192] From the apex of the alluvial fan at Milton downstream about to the McCoy bridge, which is situated on the boundary between secs. 24 and 25, T. 6 N., R. 35 E., the water table sloped away from the Walla Walla River toward the northeast and the northwest in both June and August, 1933 (Pl. 5). Therefore, the water in the alluvium was percolating away from the river. The major rise and decline of the water table which began in April and extended into July has been shown to reflect faithfully a corresponding fluctuation in the flow of the river. This rise and decline has been observed in wells as much as 2 miles away from the main channel of the river and 3 miles from the apex of the fan. Lesser fluctuations of the water table between December and March have been shown to reflect other fluctuations in the stream flow. In May and June, 1933, the water surface of the river seems to have been essentially continuous with the water table while water was flowing through this reach of the stream channel. At that time the water in the river stood less than 5 feet above the water surface in wells that are less than a tenth of a mile away, and the apparent gradient from one water surface to the other conformed approximately to the established gradient of the water table farther away. The young alluvium, which forms the stream bed, is permeable. It seems obvious, therefore, that the major ground-water waves which have passed through the alluvium opposite this reach of the stream were supplied by water lost from the river by seepage, at least in large part. In August, 1933, when no water was flowing in the river channel from the railroad bridge at Freewater downstream nearly to the McCoy bridge, the form of the water table indicated that the ground water in the alluvium was still draining away from the river, even though the water table stood as much as 25 [fol. 193] feet below the river bed in wells nearby. Clearly the river is a losing stream in this reach. In August, 1933, water was flowing in the river channel from the McCoy bridge downstream to the interstate boundary and on to the confluence with the Columbia River. Hence, this reach of the Walla Walla River was at that time a gaining stream (p. 95). The form of the water table suggests that it gains perennially.

In respect to the form of the water table, the distributaries of the Walla Walla River (p. 22) are analogous to the main channel and might likewise be losing streams. Individually they have much less capacity than the main channel and their beds appear to be less permeable because composed of gravel which contains much more fine material. However, the form of the water table is not known in sufficient detail to indicate whether or not the Milton-Freewater segment does receive water by seepage from any or all of the distributaries.

[fol. 194] Given the conical form of the water table defined by the contours of June and August, 1933 (p. 67), ground water in the Milton-Freewater segment would percolate northward and northwestward away from the apex of the fan and ultimately would reach the most remote parts of the segment in both Oregon and Washington unless it were sooner discharged. Down this cone would pass the successive recharge waves, their height decreasing as the length of the wave front increased in advancing outward from the apex. Beyond the spillway formed by the constriction in the young alluvium (p. 54), where each wave would presumably be dissipated in a measure by overflow among the inner zone of springs (p. 92), these waves would seem to become much less prominent than in the vicinity of Milton and Freewater. These postulated conditions seem to obtain throughout the range between the highest and lowest positions of the water table now known. Inasmuch as the water table would retain its general conical form unless there were a truly great decline beneath the apex of the fan at Milton it seems likely that the manner and direction of the ground-water circulation would persist through a considerably greater range in fluctuation of the water table. However, should the stream regimen at any time differ greatly from that observed in 1932 and 1933 it seems likely that the magnitude and persistence of the recharge waves would be affected accordingly.

[fol. 195] It has been shown on pages 72 and 73 that the water table seems at times to fluctuate in response to irrigation on the alluvial soil and in response to protracted rainfall in the non-growing season. Accordingly, it is presumed that a material quantity of ground water may be derived from these sources. However, so steep was the water table throughout the Milton-Freewater segment in 1933 that nowhere was the quantity of water received by penetration of irrigation water or of rainfall large enough to mask the conical form of the water table even locally. Accordingly, it seems that nowhere was the quantity sufficient to affect materially the direction or relative velocity of the percolating ground water.

[fol. 196] Disposal of the Ground Water

Springs

Location and Character

Many perennial springs issue from the younger and intermediate alluvium of the Walla Walla Basin, especially in the area underlain by the Milton-Freewater segment of the water table. Most of these springs are described in an appended table which is based on a canvass of the southeastern part of the area made in May and June, 1933. A few springs which rise in or near the distributary channels of the Walla Walla River may have been overlooked because they were drowned by the streams when the canvass was made. A number of the springs enumerated in this canvass are in reality groups of springs, each comprising several orifices so close to one another that it was not feasible to indicate each orifice on the map.

(Here follow tables, side folios 197-198.)

|fol. 197]

Record of Springs in the Walla Walla Basin, Oregon and Washington

Number	Owner	Name	Altitude [1] Feet above sea level	Source [c]	Maximum Number of openings	Maximum yield [a] Second-feet	Date 1933	Temperature of	Remarks
6413Q11	M. O. Beauchamp	South Mud Creek	.....	Younger alluvium	6+	10+	....	52	Many feeders below
6423H11	Emil Mueller	North prong of Schwartz Spring Branch	.....	do	Several	[a] 4.8	June 6	..	
6423R11		South prong of Schwartz Spring Branch	627.6	do	do	[a] 6.8	June 13	52½	
6424P11	Dr. Marshall	do	644.2	do	do	...	..	..	
6425B11	J. M. Marlatt	do	.....	do	1+	...	..	54	
654N11			.....	do	1+	...	..	..	Rises in boggy area
657L11		Mud Creek	.....	do	Several	1+	..	52	do
6510H11			.....	do	do	...	..	..	
6510L1	Jussand Live Stock and Land Co.	McEvoy Spring	735+	do	do	[a] 5.8	July 5	58	
6513P11			.....	Gardena terrace deposits	do	.5	May 25	..	do
6516H11			732.6	Younger alluvium	do	[a] 3.2	June 20	52	
6516N11	Fred Kralman	Branch of East Mud Creek	.....	do	3+	5+	..	..	
6516P11	John B. Rencken	do	.....	do	Several	...	..	..	Nearly dry in winter
6520F11	Herman Markman	North Branch of So. Mud Creek	.....	Intermediate alluvium	1	2.5	..	..	
6520J11	Phillip Murphy	South Mud Creek	723.9	Younger alluvium	Several	3	..	..	Rises in boggy area
6522N11	James Overturf	Behnke Spring	800.1	do	1	.5	..	..	
6522P11	J. Hansen	East Mud Creek	.....	do	2	1.	..	..	
6522Q11		Ford Branch	.....	do	Several	10.	..	..	Combined yield of 6526A11
6523D11	A. T. Haun		.....	do	4	.5	..	..	Rises in boggy area
6523L11		East prong of Little Walla Walla	.....	do	Several	[a] 1.6	June 5	55½	Combined yield of 6523Q11
|fol. 198]									
6523M11			.....	Younger alluvium	Several	.5	..	..	
6523P11	M. M. Dyer	Lewis Spring	834.1	do	do	[b], [a] 2.4	June 12	..	
6523P12	— Downing	Downing Spring	839+	do	do	...	..	..	
6523Q11			841.0	do	do	...	..	..	For yield see 6523L1
6523Q12	Hittle, Harp, and Jensen		837.7	do	do	[a] 3.9	June 5	..	
6523R11	Livingston ?	West prong of Big Spring Branch	.....	do	1	.5	..	..	
6524N11	— Armstrong	do	.....	do	1	1.0	..	..	
6524P11	W. W. Higgens	East prong of Big Spring Branch	.....	do	1	2.5	..	..	
6524P12	do	do	.....	do	1	...	..	..	
6524Q11	Mrs. Dyer	do	842.2	do	2	.8	..	..	
6524Q12	do	do	842.1	do	1	...	..	..	Many feeders below
6525A11	N. F. Cole	West prong of Big Spring Branch	.....	do	1	2.5	..	..	
6525A12	do	do	.....	do	1	...	..	..	
6526A11	W. L. Powell	West prong of Little Walla Walla	.....	do	1	...	..	..	For yield see 6522Q1
6526D11	C. E. Anderson	West prong of Big Spring Branch	.....	do	1	.5	..	..	
6527A11	A. A. Bixby	Middle Mud Creek	832.2	do	Several	10.	..	..	
6527A12	do	do	.....	do	do	...	..	..	
6527B11	Ben Stanton	Crystal Spring	820.5	do	do	[b], [a] 3.2	June 14	..	
6528D11	Mary Estoupe	Middle Mud Creek	.....	Intermediate alluvium	do	1.	..	..	Rises in boggy area
6528H11	do	do	.....	do	do	...	..	..	
6528J11	Lottie McKnight	Goodman Spring Branch	.....	Younger alluvium	1	.3	..	..	
6528K11	Walter Von Der Ahe	do	.....	do	2	1.5	..	..	
6528L11	do	South Mud Creek	813.1	Intermediate alluvium	Several	[a] 4.2	July 5	..	
6529M11	W. S. Edwards	Johnson Creek	783.6	do	1	[a] 3.9	June 21	..	
6529R11	First National Bank	do	.....	do	1	...	..	..	
D11	do	Dugger Creek	.....	Younger alluvium	1	...	..	..	Many small feeder
D12	do	do	.....	do	1	...	..	..	do
D13	do	do	776.6	Intermediate alluvium	1	...	..	..	
	Mary Hodgen	do	.....	do	1	...	..	..	Dry in winter mon
			904+	Younger alluvium	2+	.5	..	..	do

Record of Springs in the Walla Walla Basin, Oregon and Washington

Owner	Name	Altitude [l] Feet above sea level	Source [o]	Maximum Number of openings	yield [m] Second-feet	Date 1933	Temperature of	Remarks
uchamp	South Mud Creek	.....	Younger alluvium	6+	10+	...	52	Many feeders below head
ller	North prong of Schwartz Spring Branch	.....	do	Several	[n] 4.8	June 6	..	
	South prong of Schwartz Spring Branch	627.6	do	do	[n] 6.8	June 13	52½	
all	do	644.2	do	do	...	..	..	
latt	do	.....	do	1+	...	..	54	
		.....	do	1+	...	..	..	Rises in boggy area
	Mud Creek	.....	do	Several	1+	..	52	do
		.....	do	do	...	..	..	
ve Stock and Land Co.	McEvoy Spring	735+	do	do	[n] 5.8	July 5	58	
		.....	Gardena terrace deposits	do	.5	May 25	..	do
		732.6	Younger alluvium	do	[n] 3.2	June 20	52	
man	Branch of East Mud Creek	.....	do	3+	5+	..	..	
encken	do	.....	do	Several	...	..	..	Nearly dry in winter months
Markman	North Branch of So. Mud Creek	.....	Intermediate alluvium	1	2.5	..	..	
rphy	South Mud Creek	723.9	Younger alluvium	Several	3	..	..	Rises in boggy area
rturf	Behnke Spring	800.1	do	1	.5	..	..	
	East Mud Creek	.....	do	2	1.	..	..	
	Ford Branch	.....	do	Several	10.	..	..	Combined yield of 6522Q11 and 6526A11
		.....	do	4	.5	..	..	Rises in boggy area
	East prong of Little Walla Walla	.....	do	Several	[n] 1.6	June 5	55½	Combined yield of 6523L11 and 6523Q11
		.....	Younger alluvium	Several	.5	..	..	
er	Lewis Spring	8[illegible]1	do	do	[b], [n] 2.4	June 12	..	
ing	Downing Spring	839+	do	do	...	..	..	
		841.0	do	do	...	..	..	For yield see 6523L11
p, and Jensen		837.7	do	do	[n] 3.9	June 5	..	
?	West prong of Big Spring Branch	.....	do	1	.5	..	..	
rong	do	.....	do	1	1.0	..	..	
gens	East prong of Big Spring Branch	.....	do	1	2.5	..	..	
	do	.....	do	1	...	..	..	
	do	842.2	do	2	.8	..	..	
	do	842.1	do	1	...	..	..	Many feeders below source
	West prong of Big Spring Branch	.....	do	1	2.5	..	..	
	do	.....	do	1	...	..	..	
ell	West prong of Little Walla Walla	.....	do	1	...	..	..	For yield see 6522Q11
erson	West prong of Big Spring Branch	.....	do	1	.5	..	..	
	Middle Mud Creek	832.2	do	Several	10.	..	..	
	do	.....	do	do	...	..	..	
n	Crystal Spring	820.5	do	do	[b], [n] 3.2	June 14	..	
oupe	Middle Mud Creek	.....	Intermediate alluvium	do	1.	..	..	Rises in boggy area
	do	.....	do	do	...	..	..	
Knight	Goodman Spring Branch	.....	Younger alluvium	1	.3	..	..	
Der Ahe	do	.....	do	2	1.5	..	..	
	South Mud Creek	813.1	Intermediate alluvium	Several	[m] 4.2	July 5	..	
rds	Johnson Creek	783.6	do	1	[n] 3.9	June 21	..	
nal Bank	do	.....	do	1	...	..	..	
	Dugger Creek	.....	Younger alluvium	1	...	..	..	Many small feeders below source
	do	.....	do	1	...	..	..	do
	do	776.6	Intermediate alluvium	1	...	..	..	
en	do	.....	do	1	...	..	..	Dry in winter months
		904±	Younger alluvium	2+	.5	..	..	do
			do	1	[b], [n] 1.8	June 14	..	Many small feeders below source

			sea level				1933		
6413Q11	M. O. Beauchamp	South Mud Creek	.....	Younger alluvium	6+	10+	....	52	Many feeders below
6423H11	Emil Mueller	North prong of Schwartz Spring Branch	.....	do	Several	[n] 4.8	June 6	..	
6423R11		South prong of Schwartz Spring Branch	627.6	do	do	[n] 6.8	June 13	52½	
6424P11	Dr. Marshall	do	644.2	do	do	...	..	..	
6425B11	J. M. Marlatt	do	.....	do	1+	...	..	54	
654N11			.....	do	1+	...	..	..	Rises in boggy area
657L11		Mud Creek	.....	do	Several	1+	..	52	do
6510H11			.....	do	do	...	..	..	
6510L11	Jussand Live Stock and Land Co.	McEvoy Spring	735+	do	do	[n] 5.8	July 5	58	
6513P11			.....	Gardena terrace deposits	do	.5	May 25	..	do
6516H11			732.6	Younger alluvium	do	[n] 3.2	June 20	52	
6516N11	Fred Kralman	Branch of East Mud Creek	.....	do	3+	5+	..	..	
6516P11	John B. Rencken	do	.....	do	Several	...	..	..	Nearly dry in winte
6520F11	Herman Markman	North Branch of So. Mud Creek	.....	Intermediate alluvium	1	2.5	..	..	
6520J11	Phillip Murphy	South Mud Creek	723.9	Younger alluvium	Several	3	..	..	Rises in boggy area
6522N11	James Overturf	Behnke Spring	800.1	do	1	.5	..	..	
6522P11	J. Hansen	East Mud Creek	.....	do	2	1.	..	..	
6522Q11		Ford Branch	.....	do	Several	10.	..	..	Combined yield of 6526A11
6523D11	A. T. Haun		.....	do	4	.5	..	..	Rises in boggy area
6523L11		East prong of Little Walla Walla	.....	do	Several	[n] 1.6	June 5	55½	Combined yield of 6523Q11
[fol. 198]									
6523M11			.....	Younger alluvium	Several	.5	..	..	
6523P11	M. M. Dyer	Lewis Spring	834.1	do	do	[b], [n] 2.4	June 12	..	
6523P12	— Downing	Downing Spring	839+	do	do	...	..	..	
6523Q11			841.0	do	do	...	..	..	For yield see 6523L11
6523Q12	Hittle, Harp, and Jensen		837.7	do	do	[n] 3.9	June 5	..	
6523R11	Livingston ?	West prong of Big Spring Branch	.....	do	1	.5	..	..	
6524N11	— Armstrong	do	.....	do	1	1.0	..	..	
6524P11	W. W. Higgens	East prong of Big Spring Branch	.....	do	1	2.5	..	..	
6524P12	do	do	.....	do	1	...	..	..	
6524Q11	Mrs. Dyer	do	842.2	do	2	.8	..	..	
6524Q12	do	do	842.1	do	1	...	..	..	Many feeders below
6525A11	N. F. Cole	West prong of Big Spring Branch	.....	do	1	2.5	..	..	
6525A12	do	do	.....	do	1	...	..	..	
6526A11	W. L. Powell	West prong of Little Walla Walla	.....	do	1	...	..	..	For yield see 6522Q11
6526D11	C. E. Anderson	West prong of Big Spring Branch	.....	do	1	.5	..	..	
6527A11	A. A. Bixby	Middle Mud Creek	832.2	do	Several	10.	..	..	
6527A12	do	do	.....	do	do	...	..	..	
6527B11	Ben Stanton	Crystal Spring	820.5	do	do	[b], [n] 3.2	June 14	..	
6528D11	Mary Estoupe	Middle Mud Creek	.....	Intermediate alluvium	do	1.	..	..	Rises in boggy area
6528H11	do	do	.....	do	do	...	..	..	
6528J11	Lottie McKnight	Goodman Spring Branch	.....	Younger alluvium	1	.3	..	..	
6528K11	Walter Von Der Ahe	do	.....	do	2	1.5	..	..	
6528L11	do	South Mud Creek	813.1	Intermediate alluvium	Several	[m] 4.2	July 5	..	
6529M11	W. S. Edwards	Johnson Creek	783.6	do	1	[n] 3.9	June 21	..	
6529R11	First National Bank	do	.....	do	1	...	..	..	
6532D11	do	Dugger Creek	.....	Younger alluvium	1	...	..	..	Many small feede
6532D12	do	do	.....	do	1	...	..	..	do
6532D13	do	do	776.6	Intermediate alluvium	1	...	..	..	
6532G11	Mary Hodgen	do	.....	do	1	...	..	..	Dry in winter mon
6536D11			904±	Younger alluvium	2+	.5	..	..	do
6619J1	D. D. Nicholas		.....	do	1	[b], [n] 1.8	June 14	..	Many small feede
6619N11	Mrs. J. D. McCoy		.....	do	Several	.8	..	..	
6631A11	J. Hickman		907±	do	do	...	..	..	Dry in winter mon
7527M11	D. M. Periman	Blalock Lake	.....	do	do	...	..	..	
7535Q1	— O'Farrel		.....	do	3	.5	..	..	
7628D11	Baker, Anderson, Leisinger	Stone Creek	.....	do	3	3	..	53½	Many small feede
7630J11	U. S. Veterans Hospital		.....	do	1	1	..	..	

---

[a] By State of Oregon, Water Resources Department.

[b] By State of Washington, Department of Conservation and Development.

[l] Highest point from which water was observed to issue, May 1 to July 31, 1933, or altitude of water surface where orifice was submerged.

[m] Maximum known yield in the period 1930–1933. Unless otherwise indicated the yield is reported by W. C. Mason, assistant county watermaster, or estimated after

[n] Based on periodic measurements in 1933 by current meter or weir. (See pp. 239-256).

[o] For "younger alluvium" read young alluvium; for "intermediate alluvium" read low terrace deposits; for "Gardena terrace deposits" read high terrace deposits.

		Feet above sea level				1933		
Beauchamp	South Mud Creek	....	Younger alluvium	6+	10+	....	52	Many feeders below head
ueller	North prong of Schwartz Spring Branch	.....	do	Several	[n] 4.8	June 6	..	
	South prong of Schwartz Spring Branch	627.6	do	do	[n] 6.8	June 13	52½	
shall	do	644.2	do	do	...	..	..	
Marlatt	do	.....	do	1+	...	..	54	
		.....	do	1+	...	..	..	Rises in boggy area
	Mud Creek	.....	do	Several	1+	..	52	do
		.....	do	do	...	..	..	
Live Stock and Land Co.	McEvoy Spring	735+	do	do	[n] 5.8	July 5	58	
		.....	Gardena terrace deposits	do	.5	May 25	..	do
		732.6	Younger alluvium	do	[n] 3.2	June 20	52	
alman	Branch of East Mud Creek	.....	do	3+	5+	..	..	
Rencken	do	.....	do	Several	...	..	..	Nearly dry in winter months
Markman	North Branch of So. Mud Creek	.....	Intermediate alluvium	1	2.5	..	..	
Murphy	South Mud Creek	723.9	Younger alluvium	Several	3	..	..	Rises in boggy area
verturf	Behnke Spring	800.1	do	1	.5	..	..	
n	East Mud Creek	.....	do	2	1.	..	..	
	Ford Branch	.....	do	Several	10.	..	..	Combined yield of 6522Q11 and 6526A11
un		.....	do	4	.5	..	..	Rises in boggy area
	East prong of Little Walla Walla	.....	do	Several	[n] 1.6	June 5	55½	Combined yield of 6523L11 and 6523Q11
		.....	Younger alluvium	Several	.5	..	..	
yer	Lewis Spring	834.1	do	do	[b], [n] 2.4	June 12	..	
ning	Downing Spring	839+	do	do	...	..	..	
		841.0	do	do	...	..	..	For yield see 6523L11
arp, and Jensen		837.7	do	do	[n] 3.9	June 5	..	
on ?	West prong of Big Spring Branch	.....	do	1	.5	..	..	
strong	do	.....	do	1	1.0	..	..	
iggens	East prong of Big Spring Branch	.....	do	1	2.5	..	..	
	do	.....	do	1	...	..	..	
er	do	842.2	do	2	.8	..	..	
	do	842.1	do	1	...	..	..	Many feeders below source
lc.	West prong of Big Spring Branch	.....	do	1	2.5	..	..	
	do	.....	do	1	...	..	..	
well	West prong of Little Walla Walla	.....	do	1	...	..	..	For yield see 6522Q11
derson	West prong of Big Spring Branch	.....	do	1	.5	..	..	
by	Middle Mud Creek	832.2	do	Several	10.	..	..	
	do	.....	do	do	...	..	..	
ton	Crystal Spring	820.5	do	do	[b], [n] 3.2	June 14	..	
toupe	Middle Mud Creek	.....	Intermediate alluvium	do	1.	..	..	Rises in boggy area
	do	.....	do	do	...	..	..	
cKnight	Goodman Spring Branch	.....	Younger alluvium	1	.3	..	..	
on Der Ahe	do	.....	do	2	1.5	..	..	
	South Mud Creek	813.1	Intermediate alluvium	Several	[m] 4.2	July 5	..	
wards	Johnson Creek	783.6	do	1	[n] 3.9	June 21	..	
ional Bank	do	.....	do	1	...	..	..	
	Dugger Creek	.....	Younger alluvium	1	...	..	..	Many small feeders below source
	do	.....	do	1	...	..	..	do
	do	776.6	Intermediate alluvium	1	...	..	..	
dgen	do	.....	do	1	...	..	..	Dry in winter months
		904 ±	Younger alluvium	2+	.5	..	..	do
cholas		.....	do	1	[b], [n] 1.8	June 14	..	Many small feeders below source
. McCoy		.....	do	Several	.8	..	..	
an		907 ±	do	do	...	..	..	Dry in winter months
riman	Blalock Lake	.....	do	do	...	..	..	
rrel		.....	do	3	.5	..	..	
derson, Leisinger	Stone Creek	.....	do	3	3	..	53½	Many small feeders below source.
erans Hospital		.....	do	1	1	..	..	

Oregon, Water Resources Department.

Washington, Department of Conservation and Development.

nt from which water was observed to issue, May 1 to July 31, 1933, or altitude of water surface where orifice was submerged.

nown yield in the period 1930–1933. Unless otherwise indicated the yield is reported by W. C. Mason, assistant county watermaster, or estimated after local inquiry.

riodic measurements in 1933 by current meter or weir. (See pp. 239-256).

er alluvium" read young alluvium; for "intermediate alluvium" read low terrace deposits; for "Gardena terrace deposits" read high terrace deposits.

[fol. 199] A striking feature of the springs on and near the Milton-Freewater fan is their arrangement in three parallel zones which are concentric about the apex of the fan (Pl. 5). For convenience in description the three spring zones are designated the inner, intermediate, and outer zones. The inner zone is 3 to 3½ miles downstream from Freewater and extends from spring 6619N11, which is about half a mile east of the McCoy Bridge, to spring 6532G11, which is one of the heads of Dugger Creek. This zone comprises fully three fourths of the springs in the Walla Walla Basin and is conspicuous both on the ground and on the map (Pl. 5). The intermediate and outer spring zones are situated about 2 miles and 4 miles, respectively, beyond the inner zone. Each contains only a few springs and is not conspicuous. A number of springs issue from the alluvium of the Mill Creek fan but they are too few to indicate a systematic arrangement.

[fol. 200] Two types of spring outlets and spring channels exist. The first type is characterized by a trench-like channel 20 to 40 feet wide and 3 to 10 feet deep which is cut into the alluvial fan and which terminates sharply in a cup-shaped basin; from this constrained basin the spring issues. An example of this type is Lewis Spring Branch, No. 6523P11, which is pictured in Plate 6, A. The second type has a relatively broad channel and heads in an open amphitheater whose sides slope gently and whose floor covers as much as 10 acres and stands 5 to 10 feet below the surface of the fan. On the floor occur one or more spring orifices which discharge into an inner channel 2 to 3 feet deep. An example is the perennial head of Dugger Creek, which comprises springs 6523D11 and D12 and which is viewed in Plate 6, B. The cup-shaped basin is especially common among the springs of the inner zone.

Plate 6.—A. Head of the Lewis Spring Branch, spring 6523P11; B, Head of Dugger Creek, looking across spring 6532D12 toward spring D11.

(Here follows 1 photo, folio 201)

A, Head of the Lewis Spring Branch, spring 6523P11.

B, Head of Dugger Creek, looking across spring 6532D12 toward spring D11.

U. S. GEOLOGICAL SURVEY

Advance Data-Subject to Revision ARTHUR M. PIPER Geologist	Original data by
	Compiled by
Released OCT 30 1933 AMP	Checked by

[fol. 202] The arrangement of the orifices in distinct zones and the form of the basins and channels indicate that the springs are an integral part of the natural drainage system of the alluvial fan and that they have not come into being nor been modified materially by natural processes within historic time. This conclusion is substantiated by the statements of long-time residents, by the acceptance of the springs as trustworthy sources of water since the early settlement of the valley, and by the existence of oak trees as large as 24 inches in diameter among the water-using vegetation about some of the spring orifices. The regimen of the springs may well have been influenced in historic time by irrigation on the alluvial fans and floor plains but the springs were not created by that irrigation.

[fol. 203] Relation of Springs to the Water Table

As has been postulated on page 34, the relatively impermeable deposits of the Gardena terrace constrict the permeable young alluvium at the outer margin of the Milton-Freewater fan so that the aggregate capacity of the alluvium to transmit ground water is materially greater along the margin of the fan than in the several tongues which extend outward between the terrace remnants. This constriction acts as a barrier to impede the outward movement of water in the alluvium. Consequently, the water in the alluvium above the barrier is commonly ponded to such an extent that the water table is raised to intersect the land surface in its lowest spots. In such low spots, obviously, the spring orifices occur.

Thus, the springs of the inner zone seem to be comparable to the spillway of a reservoir, for they are supplied by overflow from the ground-water reservoir in the permeable alluvium, which is constantly replenished from above. They are the agencies which establish and maintain equilibrium between inflow and outflow of ground water across the barrier of less permeable terrace deposits at the outer margin of the fan. Consequently, the yield of the springs measures the decreased transmission capacity of the young alluvium. The springs of the intermediate and outer zones may well occur under analogous conditions though the location of some with respect to the high terrace deposits is not evident. Possibly the low terrace deposits, which are less permeable than the young alluvium, play the role of barrier and force the water table to the surface.

[fol. 204] Discharge and Fluctuation of Springs

The yield of the springs ranges from a minimum of a few gallons a minute to a maximum of about 6 cubic feet a second. The appended table of measurements of spring discharge, in the period beginning May 1, 1933, (pp. 239-256), and an accompanying diagram (fig. 5), show the discharge of typical springs. It was not feasible to measure the discharge of all the springs, although the aggregate discharge of those which were not measured must have been large. Discharge by springs accounts for the greater part of the ground water which is disposed of by natural processes.

Figure 5.—Discharge of typical springs of the inner zone.

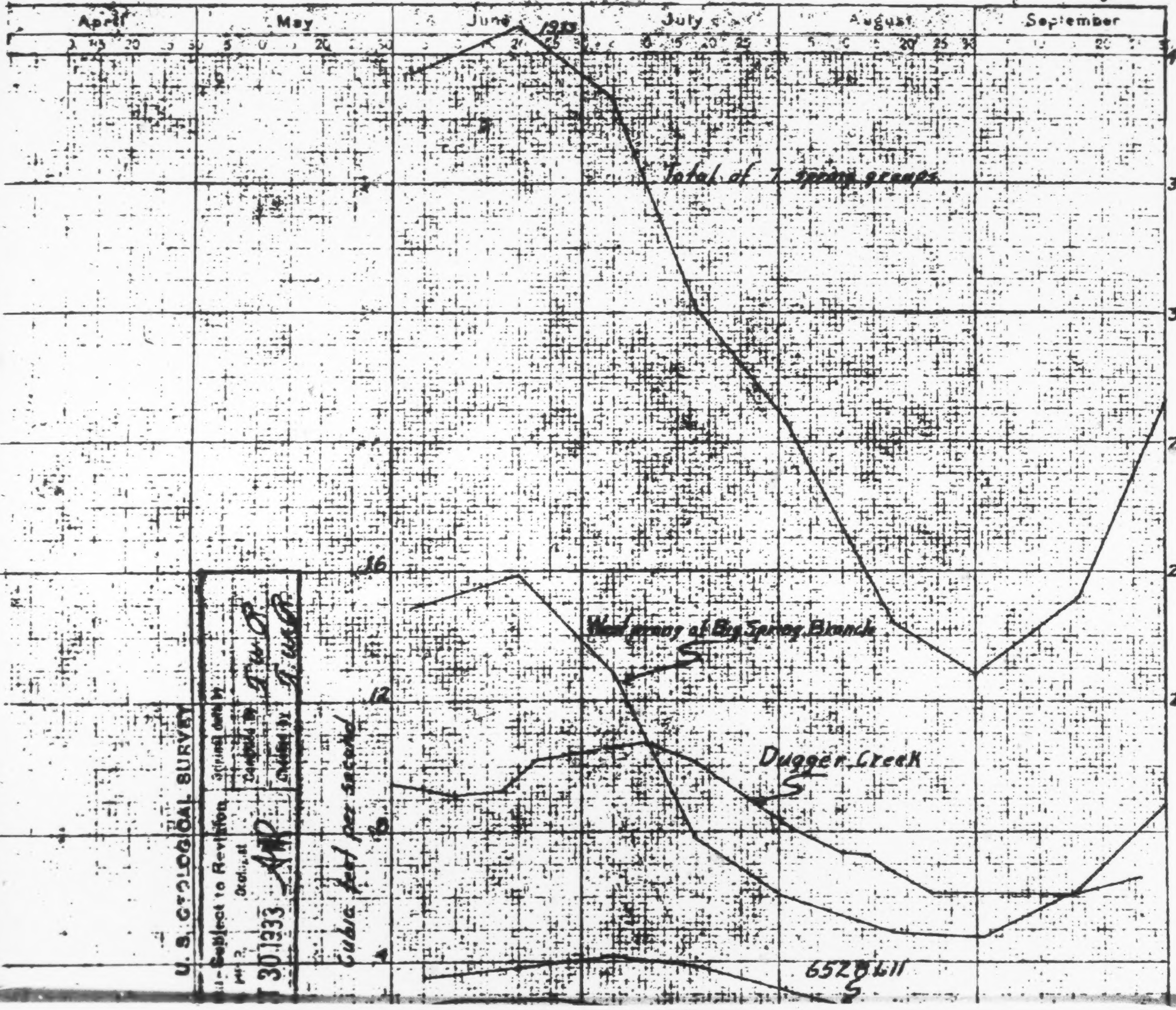
The yield of the springs fluctuates with the seasons. Figure 5 shows that the maximum yield of springs located at the south end of the inner zone lags behind that of the springs located at the east end of the zone, that is, it lags behind that of the springs closest to the river. At the south end of the zone, for example, Dugger Creek reached its maximum discharge on July 10; the maximum discharge of the west prong of Big Spring Branch had occurred on June 20, which was 20 days earlier. Measurements of depth to water show that in the vicinity of Dugger Creek the water table was high about July 10, whereas in the vicinity of the Big Spring Branch, the water table stood highest about June 20. Thus, the lag in the yield of springs at the south end of the inner zone corresponds to the lag of the water table in rising to its highest sustained level in that district. As this report is being prepared, the measurements of the discharge of typical springs have not been continued long enough to determine the character and magnitude of the fluctuations in all seasons of the year.

(Here follows 1 photo, folio 205)

ROGRAPH FOR

Washington

Figure 5



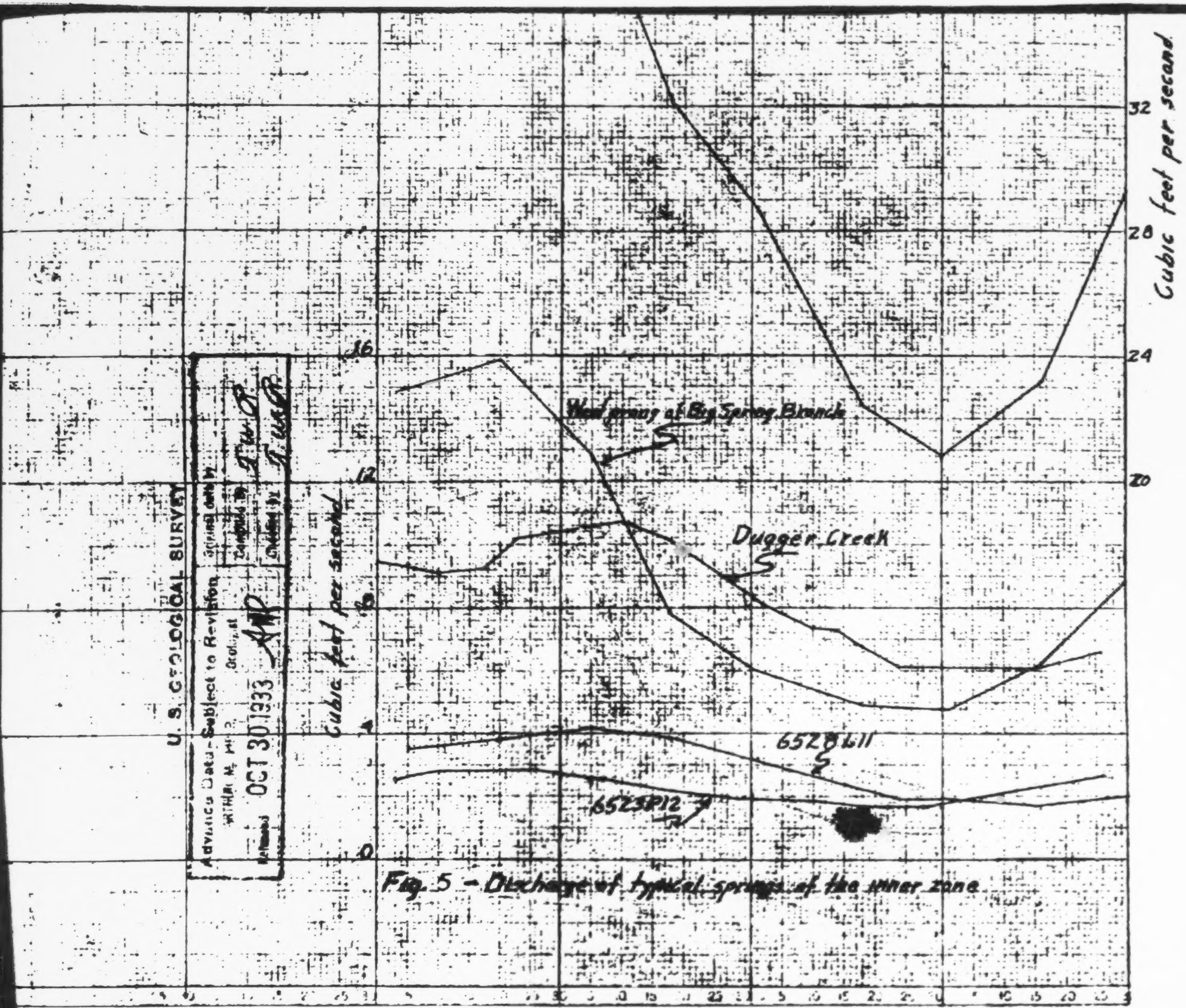


Fig. 5 – Discharge of typical springs of the inner zone.

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[fol. 206] The statements of long-time residents in the vicinity of the springs suggest some long-term fluctuations in the discharge of springs in the three zones. Thus, it is reported that the discharge of springs at the east end of the inner zone has decreased in the last 10 to 25 years, whereas the discharge appears to have remained roughly constant at the south end of the zone. The yield of springs in the intermediate zone appears to have remained about constant, or perhaps to have increased slightly. On the other hand, the discharge of the springs on the south prong of the Schwartz Spring Branch, at the southern end of the outer zone, is reported by D Kinney to have increased two or three-fold between 1910 and 1920 or 1925 but to have been nearly constant since that time. The presumptive explanation of the increased discharge is the contemporaneous growth of the area irrigated by surface water to the southeast, that is, higher on the alluvial fan. Whether the discharge of other springs in the outer zone has changed in similar fashion is not known.

It is probable that if the hydrologic regimen observed in the Walla Walla Basin in 1933 should be materially changed by modifications in the regulation of the river or by increased pumping for irrigation, the discharge of the springs in the inner zone would be affected.

[fol. 207] Gaining Segment of the Walla Walla River

The Walla Walla River seems to be a perennial gaining stream downstream from the McCoy bridge, which is between secs. 24 and 25, T. 6 N., R. 35 E., that is, water seeps into the stream channel from the alluvium. This condition continues downstream to and probably beyond Whitman Station, as is shown by the shape of the water-table contours for June 20 and August 29, 1933 (Pl. 5). Specifically, all the water-table contours less than 900 feet above sea level bulge upstream as they cross the river. This indicates that the water table slopes toward the stream and that ground water percolates toward the stream channel from either side. The 850-foot and 900-foot contours seem not to bulge upstream, owing perhaps to the lack of enough observation wells to control accurately the shape of the contours.

On July 29, 1933, the river channel was dry between the railroad bridge at Freewater and a point about 140 yards upstream from the McCoy bridge, but there was a flow beneath the McCoy bridge estimated to be 0.3 second-foot. (Pl. 4, B). The flow continued to increase downstream, and was derived entirely from ground-water seepage. The McCoy bridge is situated directly on the inner zone of springs, so that the discharge of ground water in the river channel at this place is presumably induced by the constriction in the permeable young alluvium, just as the discharge of the springs is induced. Neither the contours of the water table nor field observations suggest any other gaining stream in the area.

Plate 4.—B, Channel of the Walla Walla River at McCoy bridge, in secs. 24 and 25, T. 6 N., R. 35 E., on July 29, 1933.

[fol. 208] Irrigation Pumping Plants

Pumping from wells for irrigation probably is the second largest item in the disposal of ground water. A census made jointly by the Washington Department of Conservation and Development, and by the Oregon Department of Water Resources, during the late summer of 1932, enumerated 278 irrigation wells south of the Oregon-Washington boundary. No census of wells was made north of the interstate boundary. About three fourths of these wells are located between the apex of the Milton-Freewater fan and the inner zone of springs in secs. 25, 27, and 33-35, inclusive, T. 6 N., R. 35 E. When the census was taken, the discharge of 84 of the pumping plants was measured. Among these the discharge ranged from a minimum of 0.10 cubic foot a second to a maximum of 1.25 cubic feet a second, the average being 0.40 cubic foot a second. Nearly all of the pumping plants are operated by electric motors, which range from 1 to 20 horsepower; the popular sizes are 3 and 5 horsepower. Ordinarily the pumping season is about three months long; it begins about June 15, or whenever the Pleasantview ditch is shut off from the river, and continues until about September 15. Commonly the pumping plants are operated continuously during the irrigation season.

During the field season of 1933, pumping tests were made by the writer (Robinson) on 11 irrigation wells in the Walla Walla Basin. All of these wells were equipped with direct-connected horizontal centrifugal pumps except one well, which was equipped with a deep-well turbine pump.

[fol. 209] All of the irrigation pumping plants which were tested were on dug wells, ranging in diameter between 4 and 8 feet. Each of the centrifugal pumps is mounted on a movable platform which can be raised or lowered with a windlass as the water rises and falls in the well. The extreme range of the water level during the pumping period may be as much as 35 feet so that the pump must be lowered from time to time as the water level declines lest the suction head become uneconomically large. Because they operate more effciently if the suction lift is small, the pumps are usually set in this manner within a few feet of the water level. The majority of the pumping plants are used in an auxiliary capacity to provide water for irrigation when the supply of surface water is inadequate. All the plants are not well cared for, a condition which may account for the low mechanical efficiencies of some. The data on these tests of pumping plants are given in the following table:

[fol. 210] Measurements of Discharge and Energy Input of Pumping Plants on Wells in the Walla Walla Basin, 1933

Well number	Owner	Date of measurement	Well		Horsepower	Total lift plus friction head	Discharge	Energy input	Efficiency	Remarks
			Depth	Diameter						
		1933	Feet	Feet		Feet	Gallons a minute	Kilowatts	Per cent	
6424R1	T. A. Williams	July 11	30	4 by 6	2	22.9	185	1.74	46.1	
6525N2	Jerome Hill	July 12	58	6 by 6	5	35.3	170	4.3	26.6	
6526B1	F. E. McElrath	July 11	19	5 by 5	5	17.6	190	2.8	22.8	
6526B2	— Boerstler	July 15	46	6 by 6	5	16.9	180	3.6	16.0	Pump needs repacking; dug 28 feet, drilled 18 feet additional
6527Q1	F. G. Lamb	July 22	43	5 by 6	5	31.0	265	3.9	40.0	
6533J1	Farmers Brokerage Co.	July 22	81	5.5 by 6.5	10	42.0	485	7.8	38.2	Dug 50 feet, drilled 31 feet additional
6533J2	do	July 22	42	5 by 6	5	35.9	200	2.9	47.3	
6533M1	Shields Fruit Co.	July 12	442	6 by 6	10	40.2	380	9.0	32.0	Turbine pump; dug 52 feet, drilled 390 feet additional
6534B1	Alpha Reese	July 12	54	8 by 8	5	38.4	225	4.2	38.6	
6534P1	John Irons	July 22	34.5	4 by 4	3	26.4	190	3.0	31.9	
6534R1	M. Carter	July 22	52	4 by 4	3	17.5	85	1.7	16.4	Motor belt connected to pump

[fol. 211]

Disposal by Other Methods

In addition to the disposal of ground water by spring discharge, by pumping from wells, and by gaining streams, ground water is also discharged by transpiration and by soil evaporation. This holds particularly in the western part of the area where extensive areas bear greasewood, salt grass, and other vegetation which derives water directly from the water table. Measurements of depth to water in wells also show that there are large areas where the water table is so close to the land surface that evaporation may take place from the soil. Thus adequate facilities for the disposal of ground water by transpiration and by soil evaporation are present; undoubtedly an appreciable amount of ground water is discharged in this manner.

(Here follow 3 photos, folios 212, 213, 214)

FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 215] WASHINGTON EXHIBIT No. 19

[Title omitted]

Walla Walla River Supplemental Hydrographic Data

[fol. 216] Excerpt From U. S. Geological Survey

Water Supply Paper 492

Summary of Hydrometric Data in Washington, 1878-1919
(Pages 314-315)

Walla Walla River Basin

Mill Creek Near Walla Walla (161)

Staff gage 500 feet below diversion dam of Walla Walla waterworks and 12 miles east of Walla Walla, in Walla Walla County.

The city of Walla Walla diverts from 21 to 32 second-feet of water above the station for public water supply. Flow is regulated occasionally when gates at intake of water-supply conduit are closed when the settling basins are cleaned.

Monthly Discharge of Mill Creek near Walia Walla

Month	Discharge in second-feet			Run-off in acre-feet	Accuracy
	Maximum	Minimum	Mean		
1913					
August 27-31	29	29	29.0	288	B
September	36	29	29.3	1,740	B
The period	...	..	.....	2,000	
1913–1914 -					
October	124	29	47.0	2,890	B
November	156	38	66.0	3,930	B
December	73	36	43.3	2,660	B
January	300	49	120	7,380	A
February	387	50	141	7,830	A
March	405	83	182	11,200	A
April	236	83	134	7.970	A
May	103	60	80.4	4,940	A
June	73	40	50.3	2,990	B
July	39	32	35.5	2,180	B
August	33	32	32.6	2,000	B
September	60	32	36.4	2,170	B
The year	405	29	80.2	58,100	

Monthly Discharge of Mill Creek near Walla Walla—Continued

Month	Discharge in second-feet Maximum	Minimum	Mean	Run-off in acre-feet	Accuracy
1914–15					
October	52	34	38.0	2,340	A
November	134	35	50.1	2,980	A
December	41	..	33.8	2,080	B
January	52	34	40.5	2,490	A
February	209	61	101	5,610	A
March	334	61	124	7,620	A
April	334	64	130	7,740	A
May	440	66	148	9,100	A
June	102	32	49.5	2,950	A
July	37	27	29.8	1,830	A
August	27	22	24.4	1,500	A
September	31	22	24.1	1,430	A
The year	440	22	65.9	47,700	

[fol. 217]

Month	Discharge in second-feet Maximum	Minimum	Mean	Run-off in acre-feet	Accuracy
1915–16					
October	52	23	28.4	1,750	A
November	224	27	72.1	4,290	A
December	602	50	118	7,260	A
January	224	..	64.8	3,980	B
February	440	46	201	11,600	A
March	732	92	315	19,400	A
April	266	146	197	11,700	A
May	240	117	168	10,300	A
June	122	66	98.5	5,860	A
July	103	32	50.9	3,130	A
August	37	27	30.7	1,890	A
September	42	26	29.1	1,730	A
The year	732	23	114	82,900	
1916–17					
October	39	28	28.9	1,780	A
November	98	29	38.7	2,300	A
December	257	40	72.6	4,460	A
January	223	39	81.3	5,000	A
February	240	47	116	6,440	A
March	262	43	71.4	4,390	A
April	1,060	105	420	25,000	A
May	1,090	230	495	30,400	B
June	346	106	213	12,700	B
July	106	36	61.0	3,750	B
August	34	28	31.3	1,920	B
September	51	28	30.8	1,830	B
The year	1,090	28	138	100,000	

Note—Maximum discharge during period of record, 1,120 second-feet at 7 a.m. May 13, 1917; minimum discharge, 21 second-feet at 6:30 p.m. Aug. 29 to Sept. 1, 1915.

[fol. 218]

Copy

City of Walla Walla, February 9, 1934.

Mr. Harlow Barney, Walla Walla, Washington.

DEAR SIR:

Herewith is the water consumption for the City of Walla Walla as shown by Venturi meter at reservoir, viz:

1932. June 28 to July 30—32 days—10.7808 sec. ft.—6,967,851.98 gal. 24 hours.

1933. June 27 to Aug. 3—37 days—12,005 sec. ft.—7,767,185.10 gal. 24 hours.

Yours very truly, R. F. McLean, Supt. Water Dept.

[fol. 219]

Diversions from East Crockett between Frog and ¼ Mile North of Center Line of Section 26

Fall 1933

1. Loundigan ditch—Rect. weirs: A—length 3.71 ft.
B— " 0.79 "
C— " 1.23 "

Date	Head in inches	Discharge in cfs. Each weir	Total
Dec. 1	A: 4	2.3	
	B: 3½	0.4	
West ditch + 0.08 cfs. Est.			2.8
Dec. 2	A: 3¾	2.1	
	B: 2¾	0.3	
West ditch + 0.05 cfs. Est.			2.5
Dec. 4	A: 2⅜	1.1	
	B: 2	0.2	
West ditch + 0.04 cfs. Est.			1.3
Dec. 5	A: 2¼	1.0	
	B: 1¾	0.1	
West ditch + 0.03 cfs. Est.			1.1
Dec. 6	A: 2¾	1.3	
	B: 2¼	0.2	
West ditch + 0.04 cfs. Est.			1.5
Dec. 7	A: 2½	1.2	
	B: 2	0.2	
			1.4
Dec. 8	A: 2¾	1.3	
	B: 2¼	0.2	
			1.5
Dec. 9	A: 2⅞	1.4	
	B: 2⅛	0.2	

Diversions from East Crockett between Frog and ¼ Mile North of Center Line of Section 26—Continued

Fall 1933

1. Loundigan ditch—Rect. weirs: A—length 3.71 ft.
B— " 0.79 "
C— " 1.23 "

Date	Head in inches	Discharge in cfs.	
		Each weir	Total
West ditch + 0.04 cfs. Est.			
Dec. 11	A: 5¾	4.0	1.6
	B: 4¾	0.8	
	C: 2¼	0.3	
Dec. 12	A: 2¼	1.1	5.1
	B: 2	0.2	
Dec. 13	A: 2½	1.2	1.3
	B: 2	0.2	
Dec. 14	A: 3	1.5	1.4
	B: 2½	0.3	
Dec. 15	A: 5½	3.8	1.8
	B: 4½	0.6	
	C: 2¼	0.3	
[fol. 220]			4.7
Dec. 1	A: 4	2.3	
	B: 3½	0.4	
West ditch + 0.08 cfs. Est.			2.8
Dec. 2	A: 3¾	2.1	
	B: 2¾	0.3	
West ditch + 0.05 cfs. Est.			2.5
Dec. 4	A: 2⅜	1.1	
	B: 2	0.2	
West ditch + 0.04 cfs. Est.			1.3
Dec. 5	A: 2¼	1.0	
	B: 1¾	0.1	
West ditch + 0.03 cfs. Est.			1.1
Dec. 6	A: 2¾	1.3	
	B: 2¼	0.2	
West ditch + 0.04 cfs. Est.			1.5
Dec. 7	A: 2½	1.2	
	B: 2	0.2	
Dec. 8	A: 2¾	1.3	1.4
	B: 2¼	0.2	
Dec. 9	A: 2⅞	1.4	1.5
	B: 2⅛	0.2	

Diversions from East Crockett between Frog and ¼ Mile North of Center Line of Section 26—Continued

Fall 1933

1. Loundigan ditch—Rect. weirs: A—length 3.71 ft.
B— " 0.79 "
C— " 1.23 "

Date	Head in inches	Discharge in cfs.	
		Each weir	Total
West ditch + 0.04 cfs. Est.			1.6
Dec. 11	A: 5¾	4.0	
	B: 4¾	0.8	
	C: 2¼	0.3	
			5.1
Dec. 12	A: 2¼	1.1	
	B: 2	0.2	
			1.3
Dec. 13	A: 2½	1.2	
	B: 2	0.2	
			1.4
Dec. 14	A: 3	1.5	
	B: 2½	0.3	
			1.8
Dec. 15	A: 5½	3.8	
	B: 4½	0.6	
	C: 2¼	0.3	
[fol. 221]			4.7

All Diversions from West (Main) Crockett Between Frog and ¼ Mile North of Center Line of Sect. 26

(Except West Branch West Crockett)

1933

Date	Method	Discharge in cfs.
Nov. 29	Estimated	0.7
Dec. 1	"	0.5
" 4	"	0.6
" 5	"	0.6
" 6	"	0.5
" 7	"	0.2
" 8	"	1.5
" 9	"	0.7
" 11	"	0.8
" 12	"	0.8

Diversions from West Branch of West Crockett Between Head and Center Line of Sect. 26

1933

1. in SW¼ NE¼ Sect. 35—2.15 ft. rect. weir.

Date	Head in In.	Discharge in cfs.
Nov. 29	3	0.9
" 30	3	0.9
Dec. 1	2⅞	0.8
" 2	3	0.9
" 3	...	...
" 4	3	0.9
" 5	3⅛	0.9
" 6	3⅛	0.9
" 7	2¼	0.6

Diversions from West Branch of West Crockett Between Head and Center Line of Sec. 26—Continued

1933

2. All other diversions

Date	Method	Discharge in cfs
Nov. 29	Estimated	2.0
" 30	"	1.7
Dec. 1	"	1.6
" 4	"	1.7
" 5	"	1.1

[fol. 222] Data from U. S. G. S.

Well 551A2, Louis Howton, renter

1933	Oct. 2	b/15.10	976.06
	" 9	15.68	975.48
	" 16	b/14.64	976.52
	" 23	14.89	976.27
	" 30	14.50	976.66
	Dec. 4	15.95	975.21
	" 28	13.43	977.73

[fol. 223] Well 6525P1, U. H. Hayden, Owner Data from U. S. G. S.

1933		
Oct. 2	c/29.47	877.43
" 2	b/29.58	877.32
" 7	c/32.01	874.89
" 9	32.83	874.07
" 11	c/33.56	873.34
" 16	c/33.44	873.46
" 16	b/33.53	873.37
" 18	c/34.43	872.47
" 21	c/34.94	871.96
" 24	c/34.99	871.91
" 25	34.93	871.97
" 30	35.78	871.12
Nov. 1	c/35.77	871.13
" 4	c/25.24	881.66
" 5	c/21.15	885.75
" 6	c/18.97	887.93
" 7	c/18.56	888.34
" 8	c/18.16	888.74
" 9	c/17.66	889.22
" 11	c/17.54	889.36
" 12	c/17.84	889.06
" 14	c/17.84	889.06
" 16	c/19.77	887.13
" 17	c/21.04	885.86
" 18	c/22.42	884.48
" 19	c/24.34	882.56
" 20	c/25.61	881.29
" 21	c/26.72	880.18
" 22	c/28.39	878.51
" 24	c/30.01	876.89
Nov. 25	c/30.94	875.96
" 26	c/31.77	875.13
" 28	c/32.85	874.05
" 29	c/33.12	873.78
Dec. 1	c/33.54	873.36
" 3	c/33.41	873.49
" 4	33.39	873.51
" 6	c/33.11	873.79
" 9	c/36.16	870.74
" 10	c/24.89	882.01
" 11	c/22.47	884.43
" 14	c/18.43	888.47
" 19	c/16.18	890.72
" 21	c/16.80	890.10
" 23	c/13.60	893.30
" 25	c/12.47	894.43
" 27	c/12.25	894.65
" 28	12.14	894.76
" 29	c/11.98	894.92
" 30	c/11.68	895.22
1934		
Jan. 2	c/11.14	895.76
" 4	11.09	895.81
" 4	c/11.30	895.60
" 9	c/11.79	895.11
" 13	c/12.34	894.56
" 16	c/12.64	894.26
" 18	13.45	893.45

Well 6526P1, O. K. Goodman, Owner

1933		
Oct. 1	c/32.83	876.14
" 2	c/33.18	875.79
" 2	b/32.82	876.15
" 3	c/33.55	875.42
" 4	c/33.36	875.61
" 5	c/34.40	874.57
" 6	c/36.12	872.85
" 7	c/37.30	871.67
" 8	c/38.47	870.50
" 9	39.19	869.78
" 9	c/39.10	869.87
" 10	c/37.76	871.21
" 11	c/38.91	870.06
" 12	c/38.71	870.26
" 13	c/39.70	869.27
" 14	c/39.81	869.16
" 15	c/39.95	869.02
" 16	c/40.05	868.92
" 16	b/40.02	860.95
" 17	c/40.25	868.72
" 18	c/40.06	868.91
" 19	c/39.67	869.30
" 20	c/39.62	869.35
" 21	c/40.43	868.54
" 22	c/41.23	867.74
" 23	c/41.78	867.19
" 24	42.02	866.95
" 25	c/42.74	866.23
" 26	c/43.28	865.69
" 27	c/43.80	865.17
" 28	c/44.21	864.76
" 29	c/44.50	864.47
" 30	44.50	864.47
" 30	c/44.44	864.53
" 31	c/44.47	864.50
Nov. 1	c/44.57	864.40
" 2	c/44.66	864.31
" 3	c/44.47	864.50
" 4	c/43.97	865.00
" 5	c/43.58	....
" 6	c/43.62	865.35
" 7	c/43.80	865.17
" 8	c/44.00	864.97
" 9	c/44.13	864.84
" 10	c/44.28	864.69
" 11	c/44.47	864.50
" 12	c/44.70	864.27
" 13	c/44.91	864.06

Nov. 14	c/45.12	863.85
" 15	c/45.16	863.81
" 16	c, l/45.2	863.8–
to		
Dec. 7	c, i/45.2	863.8–
" 4	i/45.10	863.87
" 8	c/43.65	865.32
" 9	c/44.10	864.87
" 10	c/44.34	864.63
" 11	c/43.90	865.07
" 12	c/43.30	865.67
" 13	c/42.91	866.06
" 14	c/42.46	866.51
" 15	c/41.95	867.02
" 16	c/41.83	867.14
" 17	c/42.25	866.72
" 18	c/42.67	866.30
" 19	c/42.65	866.32
" 20	c/42.26	866.71
" 21	c/41.60	867.37
" 22	c/40.43	868.54
" 23	c/39.27	869.70
" 24	c/37.18	871.79
" 25	c/39.25	869.72
" 26	c/40.75	868.22
" 27	c/41.05	867.92
" 28	40.43	868.54
" 28	c/40.37	868.60
" 29	c/40.10	868.87
" 30	c/38.90	870.07
" 31	c/38.23	870.74
1934		
Jan. 1	c/38.22	870.75
" 2	c/38.68	870.29
" 3	c/39.42	869.55
" 4	39.80	860.17
" 4	c/39.74	869.23
" 5	c/40.23	868.74
" 6	c/40.76	868.21
" 7	c/41.42	867.55
" 8	c/42.15	866.82
" 9	c/42.52	866.45
" 10	c/42.80	866.17
" 11	c/42.67	866.30
" 12	c/42.22	866.75
" 13	c/42.16	866.81
" 14	c/42.38	866.59
" 15	c/42.55	866.42
" 16	c/42.74	866.23
" 17	c/42.95	866.02
" 18	c/43.05	865.92

[fol. 225] Data from U. S. G. S.

Well 6536H1, Walter Herman, Owner

1933			
Oct.	1	c, h/26.88	904.87
"	2	b, h/27.40	904.35
"	2	c, h/27.43	904.32
"	3	c, h/27.69	904.06
"	4	c, h/28.00	903.75
"	5	c, h/28.23	903.52
"	7	c, h/27.93	903.82
"	9	c, h/27.69	904.06
"	9	h/27.69	904.06
"	11	c, h/27.35	904.40
"	13	c, h/26.34	904.91
"	14	c, h/26.71	905.04
"	16	b, h/26.11	905.64
"	17	c, h/26.40	905.35
"	19	c, h/26.12	905.63
"	20	c, h/26.02	905.73
"	21	c, h/25.95	905.80
"	22	c, h/25.69	906.06
"	24	c, h/24.92	906.83
"	24	24.81	906.94
"	25	c/24.28	907.47
"	26	c/23.82	907.93
"	29	c/21.55	910.20
"	30	21.22	910.53
"	30	c/21.16	910.59
Nov.	2	c/20.84	910.91
"	3	c/20.91	910.84
"	4	c/21.28	910.47
"	5	c/21.28	910.47
"	6	c/20.99	910.76
"	7	c/20.57	911.18
"	9	c/19.93	911.82
"	10	c/19.73	912.02
"	12	c/19.73	912.02
"	14	c/20.10	911.65
"	15	c/20.69	911.06
"	16	c/21.10	910.65
"	17	c/21.58	910.17
"	18	c/22.27	909.48
"	20	c/23.89	907.86
Nov.	21	c/24.51	907.24
"	25	c/26.96	904.79
"	26	c/27.62	904.13
"	28	c/28.77	902.98
Dec.	1	c/30.36	901.39
"	2	c/30.82	900.93
"	3	c/31.26	900.49
"	4	31.64	900.11
"	4	c/31.68	900.07
"	5	c/31.95	899.80
"	6	c/32.21	899.54
"	7	c/32.45	899.30
"	8	c/32.52	899.23
"	9	c/32.50	899.25
"	10	c/32.15	899.60
"	13	c/29.47	902.28
"	14	c/28.87	902.88
"	16	c/27.56	904.19
"	19	c/24.83	906.92
"	20	c/24.49	907.26
"	22	c/23.74	908.01
"	23	c/23.30	908.45
"	25	c/21.55	910.20
"	28	c/18.92	912.83
"	29	c/18.06	913.69
"	29	17.94	913.81
1934			
Jan.	1	c/15.61	916.14
"	4	14.19	917.56
"	5	c/13.94	917.81
"	8	c/13.43	918.32
"	9	c/13.32	918.43
"	10	c/13.25	918.50
"	12	c/13.33	918.42
"	13	c/13.35	918.40
"	15	c/13.37	918.38
"	18	13.45	918.30

[fol. 226] WASHINGTON EXHIBIT No. 20

[Title omitted]

Tabulation (by Sections) of the Estimated Acreages of the Related Lands in the State of Washington Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to Location of Said Acreages in Sections, Townships and Ranges

[fol. 227]

Washington by Sections

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
2-6-33	20.00	15.00							5.00		
3-6-33	60.00			60.00							
4-6-33	353.00			53.00	300.00						
5-6-33	196.00	60.00		106.00	30.00						
6-6-33	141.00			91.00	50.00						
7-6-33	120.00			60.00	60.00						
8-6-33	360.00	100.00		140.00	120.00						
9-6-33	499.00			369.00	130.00						
10-6-33	620.00		20.00	490.00	90.00				20.00		
11-6-33	534.00			267.00	267.00						
12-6-33	330.00			20.00	310.00						
13-6-33	556.00	90.00		156.00	310.00						
14-6-33	364.00			160.00	204.00						
15-6-33	378.00			238.00	140.00						
16-6-33	207.00			37.00	170.00						
17-6-33	20.00			20.00							
[fol. 228]											
25-7-33	160.00	80.00							80.00		
34-7-33	160.00	80.00							30.00	50.00	
35-7-33	120.00	40.00							10.00	70.00	
36-7-33	50.00			50.00							
3-6-34	145.00			145.00							
4-6-34	484.00			391.00					93.00		
5-6-34	276.00	10.00		189.00					77.00		
6-6-34	276.00			276.00							
7-6-34	48.00			48.00							
9-6-34	350.00			350.00							
10-6-34	187.00			187.00							
11-6-34	284.00			284.00							
12-6-34	50.00			50.00							
14-6-34	86.00			86.00							
15-6-34	60.00			60.00							
18-6-34	132.00			132.00							

[fol. 229]

Washington by Sections—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
19-7-34	85.00	15.00							70.00		
25-7-34	50.00	10.00	2.00	30.00				8.00			
26-7-34	30.00			30.00							
27-7-34	254.00	120.00							134.00		
29-7-34	272.11	100.00							172.11		
30-7-34	396.00	60.00	20.00	40.00					276.00		
31-7-34	155.00	30.00	8.00	50.00					67.00		
32-7-34	298.00	36.00	5.00						257.00		
29-30-31-32-7-34	284.00								284.00		
33-7-34	279.96								279.96		
34-7-34	240.00	10.00	60.00			10.00			160.00		
35-7-34	210.00	50.00	55.00						105.00		
36-7-34	344.00	124.00	37.00			7.00	14.00		162.00		
35 & 36- 7-34	25.00		20.00							5.00	
[fol. 230]											
1-6-35	175.00	91.00	24.00	60.00							
2-6-35	174.25	44.25	10.00	10.00		10.00			100.00		
32 & 2-6-35	18.00	18.00									
3-6-35	129.00	90.00	14.00	9.00			10.00		6.00		
4-6-35	361.00	72.00	116.00			60.00			113.00		
5-6-35	239.10	92.50	81.60						50.00	15.00	
6-6-35	20.00	12.00							8.00		
8-6-35	8.00								8.00		
9-6-35	410.00	61.15	88.00			20.00	38.25	51.60	151.00		
10-6-35	107.50	22.00	30.00			18.00			37.50		
3, 4, 9 & 10-6-35	15.00		15.00								
3 & 10-6-35	160.80	20.00	10.00			85.80	5.00	9.00	31.00		
11-6-35	316.35	61.00	10.00	29.00					216.35		
12-6-35	171.00	80.00	20.00	10.00		20.00			41.00		
13-6-35	25.00		15.00	10.00							
14-6-35	122.69	93.69							29.00		

Continued.

[fol. 231]								
15-6-35	100.50	20.00	21.00	29.50				30.00
16-6-35	85.00	10.00	5.00					70.00
18-6-35	68.00			50.00		18.00		
22-7-35	0.50						0.50	
23-7-35	29.61	29.61						
24-7-35	250.58	158.00			20.00	10.00	62.58	
25-7-35	369.66	369.66						
26-7-35	454.53	374.44			80.09			
27-7-35	309.00	72.00	35.00				10.00	192.00
28-7-35	205.66	125.44	59.00		5.00	6.22		10.00
29-7-35	118.00	88.00					30.00	
31-7-35	132.00	25.00	25.00				10.00	72.00
32-7-35	93.00	15.00	23.00					55.00
32 & 33-7-35	37.00	15.00	7.00					15.00
33-7-35	119.70	104.70	10.00	5.00				
35-7-35	68.00	44.00	22.00		2.00			
36-7-35	40.50	23.25			17.25			
[fol. 232]								
5-6-36	82.50	74.00	8.50					
6-6-36	296.79	260.79	4.00	32.00				
8-6-36	54.00	54.00						
2-7-36	7.00		7.00					
6-7-36	7.50			7.50				
13-7-36	148.70				11.50		137.20	
14-7-36	150.00	20.00			20.00	35.00	75.00	
15-7-36	8.00			8.00				
19-7-36	17.75					7.75	10.00	
20-7-36	20.50	20.50						
21-7-36	41.45				20.00		21.45	
22-7-36	273.14	8.00				1.00	264.14	
23-7-36	161.27				7.50	27.90	125.87	
27-7-36	117.01	69.78				26.46	20.77	
28-7-36	67.79	34.98	15.38		7.03	2.50	7.90	

Continued

[fol. 233]

Washington by Sections—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
29-7-36	70.25	2.35					10.00	57.90			
30-7-36	97.31					33.13		64.18			
31-7-36	30.20			30.20							
32-7-36	38.65	7.40		1.50		11.00	18.75				
5-6-37 32-7-36	95.75	95.75									
33-7-36	198.98	103.14	15.00	70.84				10.00			
34-7-36	24.00	8.00		16.00							
35-7-36	80.00	60.00				20.00					
1-6-37	23.00					20.00		3.00			
2-6-37	17.00					12.00		5.00			
15-7-37	18.00	8.00					10.00				
16-7-37	42.00	10.50						31.50			
17-7-37	125.10	39.00				51.10	35.00				
18-7-37	48.70					19.00	4.80	24.90			

Continued

[fol. 234]

Doan Creek by Sections

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
32-7-35	54.50	29.00	17.50			8.00					
33-7-35	125.00	92.00	10.00			8.00			15.00		
34-7-35	124.00	80.00	14.00						30.00		
35-7-35	20.00	20.00									

[fol. 235]

Stone Creek by Sections

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
1-6-35	40.00	40.00									
2-6-35	133.00	52.00	28.00			12.00			41.00		
3-6-35	70.42	40.00	5.00			17.22			8.20		
31-7-35	47.20	22.20	10.00			15.00					
36-7-35	10.00	10.00									
1-6-36	4.50	4.50									
28-7-36	87.53	59.12				20.41		8.00			
29-7-36	5.00	5.00									
32-7-36	47.81						10.00		37.81		
31 & 32-7-36	162.00						82.00	80.00			

[fol. 236]

Washington Permits by Sections

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
33-7-34	15.00								15.00		
11-6-35	14.30	6.00							8.30		
28-7-36	3.60					3.60					
32-7-36	5.00	5.00									
33-7-36	7.50			7.50							

[fol. 237] **Washington Exhibit No. 21**

[Title omitted]

Tabulation (by Sections) of the Estimated Acreages of the Related Lands in the State of Oregon Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to Location of Said Acreages in Sections, Townships and Ranges

[fol. 238]

Oregon by Sections

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
13-6-34	227.91			227.91							
14-6-34	12.00	12.00									
21-6-34	114.30					25.00	23.00	5.00	61.30		
23-6-34	62.00			52.00					10.00		
24-6-34	429.00			214.00					215.00		
26-6-34	20.00								20.00		
27-6-34	135.00			135.00							
28-6-34	59.00	6.00		53.00							
Non-Sectionized											
Acres Permits											
Unclassified	65.50										
Classified	45.00	30.00	19.00				5.00	10.00			
[fol. 239]											
1-5-35	216.84			89.00			13.82	114.02			
2-5-35	285.42						51.86	233.56			
3-5-35	294.65	28.70				19.00	159.35	87.60			
4-5-35	26.30			12.32		13.98					
5-5-35	8.40	8.40									
12-5-35	168.18			12.00			121.57	34.61			
13-5-35	16.91		1.13				10.78	5.00			
[fol. 240]											
13-6-35	310.22	13.22	35.00	220.00					42.00		
14-6-35	376.15	26.00	123.18	2.00				29.90	195.07		
15-6-35	394.45	126.60	5.00				68.00	194.85			
16-6-35	69.00	30.00	19.00						20.00		
17-6-35	184.67	13.00		171.67							
18-6-35	366.06	41.00		275.06					50.00		
19-6-35	226.50			171.50			40.00		15.00		
20-6-35	349.00	110.00		219.00					20.00		
21-6-35	254.50	40.00		49.50		20.00	76.00	34.00	35.00		
22-6-35	186.29	48.79	29.00			20.00	60.00	18.50	10.00		

Oregon by Sections—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
23–6–35	297.19		159.69	9.50			19.20		108.80		
24–6–35	173.80		88.80	85.00							
25–6–35	134.10	38.55	15.00				25.00	55.55			
26–6–35	484.11	108.50	27.00				52.96	295.65			
27–6–35	486.74	151.53	20.00	20.00			25.00	139.71	130.50		
28–6–35	288.60		165.00	52.60				33.00	38.00		
29–6–35	107.30	45.00					7.30	10.00	45.00		
30–6–35	18.97	18.97									
32–6–35	221.70	10.00		191.70		10.00	10.00				
33–6–35	308.10		34.70	14.00			122.40	127.00	10.00		
33–6–35	331.50										
34–6–35	581.83	18.08						563.75			
35–6–35	593.58						21.68	571.90			
36–6–35	473.33	12.58		105.00			11.00	344.75			
[fol. 241]											
1–5–36	21.53			13.83				7.70			
2–5–36	26.80							26.80			
7–5–36	11.74	8.74						3.00			
17–5–36	9.90					4.14	3.90	1.86			
18–5–36	122.58					17.30	55.70	49.58			
19–5–36	2.60					2.60					
20–5–36	125.24		2.40			10.00	74.10	38.74			
21–5–36	167.30	27.90	44.00			13.00	48.70	33.70			
22–5–36	146.70	39.15	3.25			5.00	45.30	54.00			
23–5–36	64.73		2.20				5.20	57.33			
24–5–36	38.00					2.50	35.50				
25–5–36	52.37					13.00	3.00	36.37			
26–5–36	42.07					3.00	6.80	32.27			
27–5–36	2.20							2.20			
28–5–36	5.00							5.00			
30–5–36	76.80	36.80						40.00			
31–5–36	59.80	17.60						42.20			
32–5–36	14.33							14.33			

[fol. 242]							
13–6–36	0.50		0.50				
14–6–36	3.00	3.00					
18–6–36	21.60	11.60		10.00			
22–6–36	2.10	2.10					
24–6–36	4.00		4.00				
26–6–36	13.00					10.00	3.00
27–6–36	0.50	0.50					
30–6–36	6.50				6.50		
31–6–36	1.50	1.50					
[fol. 243]							
4–4–36	13.90					10.00	3.90
5–4–36	16.90			5.00	11.90		
6–4–36	11.30	3.30		8.00			
4–4–37	8.70						8.70
5–4–37	21.43				13.29	8.14	
9–4–37	10.10						10.10
10–4–37	10.50				10.50		
19–5–37	17.10						17.10
28–5–37	5.10						5.10
29–5–37	15.10						15.10
30–5–37	6.40					6.40	
31–5–37	49.80				23.19	26.61	

[fol. 244] **WASHINGTON EXHIBIT No. 22**

[Title omitted]

Tabulation (by Priorities) of the Estimated Acreages of the Related Lands in the State of Washington Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to the Respective Priorities and Approximate Acreages Set Out in Stipulation No. 3 of November 10, 1933

[fol. 245]

Washington

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1859						
32-7-36	37.15	7.40				11.00	18.75				
	37.15	7.40				11.00	18.75				
					1861						
13-7-36	73.50							73.50			
14-7-36	150.00	20.00				20.00	35.00	75.00			
23-7-36	67.50					7.50	10.00	50.00			
3-6-35	23.00	9.00	4.00				10.00				
	314.00	29.00	4.00			27.50	55.00	198.50			
					1863						
13-7-36	53.70							53.70			
18-7-37	29.80					5.00	4.80	20.00			
	83.50					5.00	4.80	73.70			
					1864						
22-7-36	28.00							28.00			
27-7-36	6.77							6.77			
6-6-36	3.74	3.74									
5-6-36	68.00	68.00									
6-6-36	47.00	47.00									
	153.51	118.74						34.77			
[fol. 246]					1865						
22-7-36	65.20							65.20			
27-7-36	59.03	59.03									
	124.23	59.03						65.20			
					1866						
30-7-36	83.13					33.13		50.00			
8-6-36	54.00	54.00									
	137.13	54.00				33.13		50.00			

Washington—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1868						
18-7-37	9.90					5.00		4.90			
35-7-36	80.00	60.00				20.00					
	89.90	60.00				25.00		4.90			
					1869						
21-7-36	19.95							19.95			
18-7-37	9.00					9.00					
27-7-36	16.50						8.50	8.00			
	45.45					9.00	8.50	27.95			
					1870						
29-7-36	60.33						10.00	50.33			
24-7-35	5.50	2.00						3.50			
20-7-36	20.00	20.00									
29-7-34	110.00	30.00							80.00		
30-7-34	50.00			20.00					30.00		
	245.83	52.00		20.00			10.00	53.83	110.00		
[fol. 247]					1871						
5-6-35	35.00		35.00								
	35.00		35.00								
					1872						
23-7-36	10.00						10.00				
35-7-35	25.00	25.00									
4-6-35	35.00	30.00	5.00								
27-7-36	9.75	9.75									
	79.75	64.75	5.00				10.00				

15–7–37	10.00				1873	10.00	
22–7–37	3.00					3.00	
	13.00					13.00	
35–7–37	5.00				1875		5.00
26–7–37	7.50					7.50	
23–7–36	7.90					7.90	
	20.40					15.40	5.00
29–7–36	1.32				1876		1.32
	1.32						1.32
19–7–38	4.00				1877	4.00	
15–7–36	8.00			8.00			
	12.00			8.00		4.00	
[fol. 248]							
22–7–36	35.00	8.00			1878		27.00
23–7–36	6.37						6.37
6–6–36	13.40	13.40					
	54.77	21.40					33.37
30–7–38	3.00				1880		3.00
22–7–36	22.20						22.20
	25.20						25.20
1–6–37	3.00				1881		3.00
7–6–38	3.00						3.00
29–7–36	5.50						5.50
3–6–35	40.00	30.00	10.00				
	51.50	30.00	10.00				11.50

Washington—Continued

Section	Acres	1	1D	1R°	1RA	2A	°2B°	3	4	5	6
					1882						
26–7–35	15.00					15.00					
27–7–35	50.00	20.00	10.00					10.00	10.00		
16–6–35	5.00	5.00									
15–6–35	21.00		21.00								
	91.00	25.00	31.00			15.00		10.00	10.00		
[fol. 249]					1883						
23–7–36	20.50							20.50			
27–7–36	6.00							6.00			
22–7–36	16.00						1.00	15.00			
34–7–36	3.00	3.00									
30–7–36	5.73							5.73			
29–7–36	0.50							0.50			
	51.73	3.00					1.00	47.73			
					1884						
28–7–36	15.70	15.70									
24–7–37	3.00						3.00				
25–7–37	2.00						2.00				
26–7–37	3.00						3.00				
4–6–35	103.00	25.00	15.00			30.00			33.00		
33–7–36	87.78	87.78									
5–6–35	60.00		10.00						50.00		
	274.48	128.48	25.00			30.00	8.00		83.00		
[fol. 250]					1885						
21–7–36	20.00					20.00					
28–7–36	2.88		2.88								
36–7–35	15.00	15.00									
27–7–35	57.00	7.00							50.00		
	94.88	22.00	2.88			20.00			50.00		

				1886					
17-7-37	25.10	9.00			16.10				
22-7-36	2.00						2.00		
2-6-35	18.50	18.50							
5-6-36 & 32-7-36	95.75	95.75							
33-7-36	10.00		10.00						
9-6-35	20.00	5.00				15.00			
	171.35	128.25	10.00		16.10	15.00	2.00		
[fol. 251]				1887					
28-7-35	25.00	20.00			5.00				
28-7-36	5.00	5.00							
20-7-36	0.50	0.50							
	30.50	25.50			5.00				
				1889					
28-7-36	15.00	10.00					5.00		
19-7-36	17.75					7.75	10.00		
24-7-35	83.66	15.00			20.00	10.00	38.66		
16-6-35	52.00							52.00	
9-6-35	203.90	19.65			20.00	13.25		151.00	
4-6-35	110.00				30.00			80.00	
5-6-35	97.50	92.50							5.00
	579.81	137.15			70.00	31.00	53.66	283.00	5.00
				1890					
22-7-37	6.00						6.00		
23-7-36	31.00						31.00		
22-7-36	11.00						11.00		
29-7-36	0.50	0.50							
	48.50	0.50					48.00		

Washington—Continued

[fol. 252]

1891

Section	Acres	1	1D	1R	1RA	A2	2B	3	4	5	6
35-7-37	5.00							5.00			
28-7-36	1.98	1.98									
14-6-35	67.19	61.19							6.00		
11-6-35	40.00								40.00		
15-6-35	64.50	20.00		29.50					15.00		
9-6-35	29.00		29.00								
	207.67	83.17	29.00	29.50				5.00	61.00		
					1892						
3-6-33	60.00			60.00							
4-6-33	353.00			53.00	300.00						
5-6-33	196.00	60.00		106.00	30.00						
6-6-33	141.00			91.00	50.00						
7-6-33	120.00			60.00	60.00						
8-6-33	360.00	100.00		140.00	120.00						
9-6-33	499.00			369.00	130.00						
10-6-33	620.00		20.00	490.00	90.00				20.00		
11-6-33	534.00			267.00	267.00						
[fol. 253]											
12-6-33	330.00			20.00	310.00						
13-6-33	556.00	90.00		156.00	310.00						
14-6-33	364.00			160.00	204.00						
15-6-33	378.00			238.00	140.00						
16-6-33	207.00			37.00	170.00						
17-6-33	20.00			20.00							
3-6-34	145.00			145.00							
4-6-34	391.00			391.00							
5-6-34	189.00			189.00							
6-6-34	272.00			272.00							
7-6-34	48.00			48.00							
9-6-34	350.00			350.00							
10-6-34	187.00			187.00							
11-6-34	284.00			284.00							
12-6-34	50.00			50.00							

[fol. 254]									
14-6-34	86.00			86.00					
15-6-34	60.00			60.00					
18-6-34	132.00			132.00					
18-6-35	68.00			50.00			18.00		
24-7-35	16.62							16.62	
25-7-35	369.66	369.66							
1-6-35	20.00	10.00		10.00					
14-6-35	55.50	32.50							23.00
11-6-35	87.70	10.00							77.70
35-7-34	110.00	20.00	40.00						50.00
27-7-34	194.00	120.00							74.00
34-7-34	130.00	10.00	60.00			10.00			50.00
19-7-34	85.00	15.00							70.00
30-7-34	226.00	60.00							166.00
[fol. 355]									
25-7-33	160.00	80.00							80.00
32-7-34	65.00	28.00							37.00
5-6-34	87.00	10.00							77.00
31-7-34	115.00	30.00	8.00	50.00					27.00
4-6-34	43.00								43.00
6-6-34	4.00			4.00					
29-7-34	2.11								2.11
11-6-35	65.65	14.00							51.65
10-6-35	52.50		15.00						37.50
	8,888.74	1,059.16	143.00	4,575.00	2,181.00	10.00	18.00	16.62	885.96
					1893				
5-6-36	6.00	6.00							
11-6-35	12.00								12.00
33-7-34	124.96								124.96
32-7-34	233.00	8.00	5.00						220.00
34-7-34	74.00								74.00
	449.96	14.00	5.00						430.96

Washington—Continued

1894

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
[fol. 256]											
1-6-37	20.00					20.00					
16-7-37	26.00							26.00			
28-7-35	20.00	10.00	10.00								
29-7-35	118.00	88.00						30.00			
32-7-35	15.00	15.00									
31-7-35	10.00							10.00			
27-7-36	1.00	1.00									
4-6-35	12.00	12.00									
9-6-35	122.10	36.50	59.00				10.00	16.60			
3-6-35	8.00								8.00		
5-6-35	25.60		15.60							10.00	
6-6-35	20.00	12.00							8.00		
	397.70	174.50	84.60			20.00	10.00	82.60	16.00	10.00	
[fol. 257]					1895						
35-7-37	8.00							8.00			
22-7-36	2.75							2.75			
2-6-35	115.00	15.00							100.00		
11-6-35	71.00	35.00		29.00					7.00		
3-6-35	35.00	25.00		4.00					6.00		
29-7-36	0.25	0.25									
33-7-36	15.00		15.00								
28-7-35	20.00	20.00									
	267.00	95.25	15.00	33.00				10.75	113.00		
[fol. 258]					1896						
28-7-35	82.66	66.44	10.00				6.22				
27-7-35	100.00	15.00							85.00		
36-7-35	3.25	3.25									
33-7-35	5.00			5.00							
32-7-36	1.50			1.50							
4-6-35	65.00		65.00								
29-7-36	1.60	1.60									
27-7-36	1.38						1.38				
	260.39	86.29	75.00	6.50			7.60		85.00		

22-7-35	0.50				1897			0.50	
6-6-36	40.00	40.00							
33-7-36	47.75	9.50		38.25					
	88.25	49.50		38.25				0.50	
33-7-36	5.00			5.00	1899				
33-7-35	36.00	26.00	10.00						
	41.00	26.00	10.00	5.00					
[fol. 259]					1900				
13-7-36	10.00							10.00	
22-7-36	7.50							7.50	
36-7-35	17.25					17.25			
27-7-36	16.58						16.58		
33-7-36	3.50	3.50							
6-6-36	20.00	20.00							
16-7-37	5.00	5.00							
28-7-36	1.00	1.00							Page 95 in Decree
31-7-35	65.00	15.00	20.00						30.00
32-7-35	70.00		15.00						55.00
	215.83	44.50	35.00			17.25	16.58	17.50	85.00
[fol. 260]					1901				
2-6-37	2.00					2.00			
22-7-36	23.33							23.33	
21-7-36	1.50							1.50	
30-7-36	6.75							6.75	
2-6-35	20.00		10.00			10.00			
27-7-35	52.00	15.00	10.00						27.00
16-6-35	1.00								1.00
	106.58	15.00	20.00			12.00		31.58	28.00

Washington—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1902						
28-7-36	1.00							1.00			
31-7-35	52.00	10.00							42.00		
10-6-35	38.00	10.00	10.00			18.00					
32 & 33-7-35	37.00	15.00	7.00						15.00		
	128.00	35.00	17.00			18.00		1.00	57.00		
[fol. 261]					1903						
22-7-36	1.66							1.66			
28-7-36	0.90							0.90			
10-6-35	17.00	12.00	5.00								
25-7-31	40.00					40.00					
	59.56	12.00	5.00			40.00		2.56			
					1904						
35-7-33	120.00	40.00							10.00	70.00	
2-6-33	20.00	15.00							5.00		
34-7-33	160.00	80.00							30.00	50.00	
29-7-38	1.00							1.00			
23-7-35	29.61	29.61									
26-7-35	432.58	374.44				58.14					
28-7-35	19.00	9.00							10.00		
25-7-34	20.00	10.00	2.00					8.00			
36-7-34	232.00	116.00	17.00				14.00		85.00		
35-7-34	75.00	30.00	15.00						30.00		
[fol. 262]											
22-7-36	0.50							0.50			
36-7-35	5.00	5.00									
28-7-36	3.50	1.00					2.50				
33-7-36	8.59			8.59							
11-6-35	28.00								28.00		
29-7-36	0.25							0.25			
	1,155.03	710.05	34.00	8.59		58.14	16.50	9.75	198.00	120.00	

22-7-36	2.00				1905			2.00	
28-7-36	0.50							0.50	
23-7-36	13.00							13.00	
24-7-35	3.80							3.80	
16-6-35	10.00	5.00	5.00						
33-7-35	78.70	78.70							
	108.00	83.70	5.00					19.30	
[fol. 263]					1906				
28-7-36	2.50		2.50						
6-6-36	26.00	26.00							
12-6-35	96.00	70.00							26.00
	124.50	96.00	2.50						26.00
2-6-37	9.00				1907	4.00		5.00	
23-7-36	5.00							5.00	
22-7-36	10.00							10.00	
12-6-35	35.00	10.00	5.00			20.00			
32 & 2-6-35	18.00	18.00							
34-7-36	16.00			16.00					
6-6-36	59.90	55.90	4.00						
4-6-34	50.00								50.00
	202.90	83.90	9.00	16.00		24.00		20.00	50.00
[fol. 264]					1908				
28-7-35	8.00		8.00						
35-7-35	6.00	4.00				2.00			
6-6-36	34.75	34.75							
1-6-35	20.00	20.00							
33-7-36	5.00			5.00					
3 & 10-6-35	160.80	20.00	10.00			85.80	5.00	9.00	31.00
36-7-34	65.00	8.00	20.00			7.00			30.00
	299.55	86.75	38.00	5.00		94.80	5.00	9.00	61.00

Washington—Continued

1909

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
6-6-36	22.00	20.00		2.00							
28-7-36	1.50					1.00		0.50			
	23.50	20.00		2.00		1.00		0.50			
					1910						
28-7-35	17.00		17.00								
28-7-36	0.63	0.30				0.33					
30-7-36	1.70							1.70			
	19.33	0.30	17.00			0.33		1.70			
					1911						
27-7-35	50.00	15.00	15.00						20.00		
	50.00	15.00	15.00						20.00		
[fol. 265]					1912						
22-7-36	4.00							4.00			
1-6-35	16.00	16.00									
4 & 9 & 10 & 3-6-35	15.00		15.00								
	35.00	16.00	15.00					4.00			
					1913						
26-6-35	6.95					6.95					
28-7-36	0.86					0.86					
2-6-35	10.75	10.75									
1-6-35	2.00		2.00								
13-7-36	3.50					3.50					
	24.06	10.75	2.00			11.31					
					1914						
24-7-35	80.00	80.00									
35-7-35	37.00	15.00	22.00								
2-7-36	7.00		7.00								
6-7-36	7.50			7.50							
	131.50	95.00	29.00	7.50							

[fol. 266]					1915				
28–7–36	1.10					1.10			
33–7–36	10.00						10.00		
	11.10					1.10	10.00		
					1916				
28–7–36	0.40					0.40			
35 & 36–7–34	25.00		20.00						5.00
26–7–34	8.00							8.00	
	33.40		20.00			0.40		8.00	5.00
					1917				
28–7–36	1.08					1.08			
6–6–36	30.00			30.00					
31–7–36	30.20			30.20					
5–6–35	21.00		21.00						
5–6–36	8.50		8.50						
	90.78		29.50	60.20		1.08			
[fol. 267]					1919				
1–6–35	25.00	25.00							
33–7–36	6.36	2.36		4.00					
4–6–35	9.00	5.00	4.00						
9–6–35	35.00						35.00		
	75.36	32.36	4.00	4.00			35.00		
					1920				
22–7–36	2.00						2.00		
28–7–36	1.24					1.24			
3–6–35	18.00	13.00		5.00					
11–6–35	12.00	2.00	10.00						
16–6–35	17.00							17.00	
36–7–33	50.00			50.00					
15–6–35	15.00							15.00	
	115.24	15.00	10.00	55.00		1.24	2.00	32.00	

Washington—Continued

1921

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
[fol. 268]											
28-7-36	0.52					0.52					
1-6-35	2.00		2.00								
	2.52		2.00			0.52					
					1923						
22-7-36	1.00							1.00			
28-7-36	10.00		10.00								
	11.00		10.00					1.00			
					1924						
2-6-37	6.00					6.00					
27-7-34	35.00								35.00		
	41.00					6.00			35.00		
					1925						
28-7-36	0.50					0.50					
	0.50					0.50					
					1926						
30-7-38	12.00							12.00			
35-7-37	10.00							10.00			
26-7-37	52.80							52.80			
23-7-37	10.00							10.00			
22-7-37	50.00					50.00					
15-7-37	8.00	8.00									
[fol. 269]											
16-7-37	11.00	5.50						5.50			
21-7-37	13.00					13.00					
17-7-37	100.00	30.00				35.00	35.00				
22-7-36	39.00							39.00			
24-7-35	61.00	61.00									
28-7-35	14.00		[illegible].00								
25-7-34	30.00			30.00							

26–7–34	30.00			30.00							
30–7–34	20.00			20.00							
13–7–36	8.00					8.00					
34–7–36	5.00	5.00									
1–6–35	90.00	20.00	20.00	50.00							
2–6–35	10.00			10.00							
12–6–35	40.00		15.00	10.00					15.00		
31–7–34	40.00								40.00		
13–6–35	25.00		15.00	10.00							
[fol. 270]											
4–6–35	27.00		27.00								
27–7–34	25.00								25.00		
30–7–34	100.00		20.00						80.00		
29–7–34	160.00	70.00							90.00		
36–7–34	39.00								39.00		
33–7–34	155.00								155.00		
32–7–35	8.00		8.00								
3–6–35	13.00	13.00									
35–7–34	25.00								25.00		
31–7–35	5.00		5.00								
29, 30, 31 & 32–7–34	284.00								284.00		
34–7–34	36.00								36.00		
	1,555.80	212.50	124.00	160.00		106.00	35.00	129.30	789.00		
	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
Grand Total	18,086.64	4,137.88	917.48	5,043.54	2,181.00	690.40	303.13	1,156.29	3,516.92	140.00	

[fol. 271]

Doan Creek

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1871						
33–7–35	60.00	60.00									
					1875						
32–7–35	12.50		12.50								

Doan Creek—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1880						
32–7–35	2.00	2.00									
					1885						
34–7–35	4.00		4.00								
32–7–35	5.00		5.00								
					1907						
35–7–35	20.00	20.00									
					1909						
34–7–35	120.00	80.00	10.00						30.00		
					1914						
33–7–35	65.00	32.00	10.00			8.00			15.00		
32–7–35	20.00	12.00				8.00					
					1917						
32–7–35	15.00	15.00									
	323.50	221.00	41.50			16.00			45.00		

[fol. 272]

Stone Creek

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1863						
2–6–35	60.00	37.00	8.00						15.00		
31–32–7–36	162.00						82.00	80.00			
					1865						
31–7–35	47.20	22.20	10.00			15.00					
					1867						
3–6–35	49.20	30.00	5.00			6.00			8.20		
					1875						
32–7–36	47.81						10.00		37.81		
					1883						
28–7–36	5.52	1.00				4.52					

28-7-36	42.04	22.75		1884	11.29	8.00	
2-6-35	63.00	15.00	10.00	1888	12.00		26.00
28-7-36	6.60	2.00		1889	4.60		
36-7-35	10.00	10.00		1890			
3-6-35	21.22	10.00		1894	11.22		
28-7-36	1.50	1.50		1898			
28-7-36	1.50	1.50		1899			
28-7-36 1-6-35	18.87 34.00	18.87 34.00		1901			
2-6-35 1-6-35	10.00 6.00	 6.00	10.00	1904			
[fol. 273]							
28-7-36	1.00	1.00		1905			
28-7-36	0.75	0.75		1906			
28-7-36 29-7-36	1.75 5.00	1.75 5.00		1907			
28-7-36	1.00	1.00		1908			
28-7-36	7.00	7.00		1909			
1-6-35	4.50	4.50		1910			

[fol. 274]

Permits in Washington

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
28-7-36	3.60				1922	3.60					
33-7-34	15.00				1927				15.00		
32-7-36	5.00	5.00			1928						
33-7-36	7.50			7.50	1929						
11-6-35	14.30	6.00			1932				8.30		
	45.40	11.00		7.50		3.60			23.30		

[fol. 275] **WASHINGTON EXHIBIT No. 23**

[Title omitted]

Tabulation (by Priorities) of the Estimated Acreages of the Related Lands in the State of Oregon Having Water Rights According to Decrees or Permits in Evidence in This Case, Falling in the Respective Soil Classifications Shown by Youngs' Soil Map According to the Respective Priorities and Approximate Acreages Set Out in Stipulation No. 3 of November 10, 1933

Oregon

[fol. 276]

1862

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
18-6-36	1.60	1.60									
20-5-36	28.94					10.00		18.94			
24-5-36	5.30						5.30				
	35.84	1.60				10.00	5.30	18.94			
					1864						
13-6-35	38.22	13.22	10.00						15.00		
	38.22	13.22	10.00						15.00		
					1865						
12-5-35	13.23							13.23			
20-5-36	22.39						22.39				
1-5-35	1.00							1.00			
13-6-36	0.50		0.50								
	37.12		0.50				22.39	14.23			
					1866						
12-5-35	3.30							3.30			
	3.30							3.30			
					1867						
24-6-35	6.00		6.00								
12-5-35	2.24						2.24				
	8.24		6.00				2.24				
					1868						
21-5-36	23.80	10.80	13.00								
12-5-35	23.07						23.07				
13-5-35	5.35						5.35				
1-5-35	5.00							5.00			
23-6-35	4.00								4.00		
	61.22	10.80	13.00				28.42	5.00	4.00		

				1869		
12-5-35	1.18				1.18	
1-5-35	3.00					3.00
	4.18				1.18	3.00
[fol. 277]				1870		
23-6-35	9.50		9.50			
22-5-36	11.10				5.00	6.10
26-5-36	12.20					12.20
12-5-35	10.01					10.01
1-5-36	7.00					7.00
	49.81		9.50		5.00	35.31
				1871		
22-5-36	2.00				2.00	
12-5-35	1.56				1.56	
35-6-35	4.50					4.50
26-6-36	3.00					3.00
	11.06				3.56	7.50
				1872		
21-5-36	3.50				3.50	
4-4-36	10.00				10.00	
2-5-35	8.64					8.64
12-5-35	4.21					4.21
1-5-35	18.43					18.43
26-6-35	1.00	1.00				
27-6-35	10.00	5.00			5.00	
	55.78	6.00			18.50	31.28
				1873		
18-5-36	49.30				25.00	24.30
12-5-35	9.20				9.20	
7-5-36	7.00	4.00				3.00
	65.50	4.00			34.20	27.30

Oregon—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
[fol. 278]					1874						
12-5-35	3.86							3.86			
35-6-35	3.00							3.00			
14-6-35	18.40								18.40		
	25.26							6.86	18.40		
					1875						
36-5-36	6.00							6.00			
26-6-35	15.75							15.75			
12-5-35	8.56						8.56				
2-5-35	27.70						10.00	17.70			
1-5-35	14.00							14.00			
20-5-36	6.31						6.31				
22-6-36	2.10	2.10									
4-4-36	3.90							3.90			
3-5-35	33.75						16.75	17.00			
35-6-35	10.00							10.00			
14-6-35	148.06	20.00	47.06					26.00	55.00		
15-6-35	77.60	18.00						59.60			
23-6-35	44.20		25.00						19.20		
24-6-36	4.00		4.00								
	401.93	40.10	76.06				41.62	169.95	74.20		
[fol. 279]					1876						
22-5-36	18.10						18.10				
5-4-37	8.14						8.14				
18-5-36	14.78							14.78			
31-5-36	4.50							4.50			
2-5-35	6.38						6.38				
35-6-35	5.00							5.00			
36-6-35	16.00							16.00			
33-6-35	15.00							15.00	Waste		
	87.90						32.62	55.28			

					1877				
20–5–36	38.54						38.54		
22–5–36	8.80							8.80	
18–5–36	9.70						9.70		
17–5–36	4.14					4.14			
2–5–36	24.80							24.80	
12–5–35	0.25						0.25		
14–6–36	1.50	1.50							Lone Pine
	87.73	1.50				4.14	48.49	33.60	
[fol. 280]					1878				
21–5–36	26.00	10.00	3.00			8.00	5.00		
22–5–36	15.30	5.00				5.00	5.30		
25–5–36	6.17						3.00	3.17	
12–5–35	11.87						11.87		
14–6–35	6.90	3.00						3.90	
26–6–35	6.00							6.00	
25–6–35	9.50							9.50	
	81.74	18.00	3.00			13.00	25.17	22.57	
					1879				
1–5–35	1.82							1.82	
12–5–35	1.91						1.91		
35–6–35	13.00							13.00	
36–6–35	14.82							14.82	
	31.55						1.91	29.64	
					1880				
24–5–36	10.00						10.00		
22–5–36	7.20							7.20	
31–5–37	26.40					13.40	13.00		
20–5–36	2.40		2.40						
2–5–35	33.38						20.00	13.38	
12–5–35	15.70						15.70		
1–5–35	2.00							2.00	
3–5–35	33.00						15.00	18.00	
35–6–35	17.70							17.70	
33–6–35	10.00						5.00	5.00	
4–5–35	12.32			12.32					

Oregon—Continued

[fol. 281

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1880						
14-6-35	14.87								14.87		
15-6-35	40.00						5.00	35.00			
	224.97		2.40	12.32		13.40	83.70	98.28	14.87		
					1881						
21-5-36	60.20		15.00			5.00	30.20	10.00			
31-5-37	8.39					4.39	4.00				
2-5-35	3.17							3.17			
3-5-35	15.00						8.00	7.00			
35-6-35	26.70							26.70			
26-6-35	10.00	10.00									
23-6-35	6.50						6.50				
22-6-35	1.00						1.00				
	130.96	10.00	15.00			9.39	49.70	46.87			
					1882						
24-5-36	2.00						2.00				
9-4-37	9.10							9.10			
12-5-35	0.33						0.33				
35-6-35	8.50						8.50				
26-6-35	9.75							9.75			
14-6-35	53.22		26.22						27.00		
24-6-35	4.00		4.00								
	86.90		30.22				10.83	18.85	27.00		
[fol. 282]					1883						
5-4-37	7.25					7.25					
2-5-35	11.41							11.41			
12-5-35	7.03						7.08				
26-6-35	22.90							22.90			
35-6-35	6.50							6.50			
22-6-35	13.00					7.00	6.00				
	68.09					14.25	13.03	40.81			

					1884				
22-5-36	8.00							8.00	
2-5-35	7.00							7.00	
14-6-36	1.50	1.50							Lone Pine
	16.50	1.50						15.00	
					1885				
22-5-36	29.40	14.40						15.00	
4-4-37	5.15							5.15	
27-5-36	2.20							2.20	
20-5-36	9.40							9.40	
18-5-36	0.50							0.50	
12-5-35	13.35						13.35		
1-5-35	0.63							0.63	
14-6-35	2.00			2.00					
35-6-35	41.68							41.68	
26-6-35	5.00							5.00	
2-5-35	26.04							26.04	
22-6-35	14.00		7.00				7.00		
	149.35	14.40	7.00	2.00			20.35	105.60	
[fol. 283]					1886				
2-5-35	5.88							5.88	
36-6-35	7.38							7.38	
25-6-35	2.75	2.75							
34-6-35	14.50							14.50	
27-6-35	9.00							9.00	
35-6-35	6.00							6.00	
33-6-35	5.00							5.00	
26-6-35|	4.00							4.00	
15-6-35	13.00	6.00					7.00		
22-6-35	19.00	9.00				10.00			
	86.51	17.75				10.00	7.00	51.76	

Oregon—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1887						
22-5-36	1.00						1.00				
25-5-36	15.10							15.10			
31-5-37	9.61						9.61				
2-5-35	21.18							21.18			
12-5-35	0.34						0.34				
25-6-35	44.55	20.00	10.00					14.55			
36-6-35	19.00							19.00			
35-6-35	18.70							18.70			
1-5-35	4.40							4.40			
23-6-35	61.60		29.00						32.60		
27-6-35	12.28	6.28							6.00		
26-6-35	10.00							10.00			
	217.76	26.28	39.00				10.95	102.93	38.60		
[fol. 284]					1888						
19-5-37	17.10							17.10			
30-5-37	2.40						2.40				
23-5-36	14.40							14.40			
26-5-36	6.87							6.87			
10-4-37	9o00					9.00					
25-5-36	4.10							4.10			
2-5-35	4.92							4.92			
12-5-35	3.79						3.79				
3-5-35	5.00						5.00				
1-5-35	0.50							0.50			
26-6-35	9.75							9.75			
27-6-35	14.55	7.55						7.00			
35-6-35	1.00							1.00			
	93.38	7.55				9.00	11.19	65.64			

				1889				
22–5–36	13.90	5.00					8.90	
24–5–36	1.50					1.50		
23–5–36	10.20					5.20	5.00	
28–5–36	5.00						5.00	
12–5–35	1.15					1.15		
2–5–35	7.86						7.86	
36–6–35	10.75						10.75	
35–6–35	14.25						14.25	
24–6–35	8.00		8.00					
	72.61	5.00	8.00			7.85	51.76	
[fol. 285]				1890				
22–6–35	8.29	8.29						
13–5–35	2.94					2.94		
15–6–35	52.00	15.00				19.00	18.00	
21–5–36	6.50						6.50	
12–5–35	3.13					3.13		
2–5–35	5.62						5.62	
3–5–35	15.00					15.00		
1–5–35	3.12						3.12	
34–6–35	4.00						4.00	
14–6–35	8.00							8.00
35–6–35	51.22						51.22	
26–6–35	23.53						23.53	
1–5–36	0.70						0.70	
	184.05	23.29				40.07	112.69	8.00
				1891				
28–5–37	5.10						5.10	
29–5–37	15.10						15.10	
24–5–36	5.20					5.20		
9–4–37	1.00						1.00	
10–4–37	1.50				1.50			
22–5–36	6.50	3.25	3.25					
3–5–35	10.00					10.00		

Oregon—Continued

[fol. 286]

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1891						
2-5-36	2.00							2.00			
36-6-35	31.98							31.98			
1-5-35	4.63							4.63			
2-5-35	1.58						1.58				
25-6-35	19.57							19.57			
36-6-35	8.83	8.83									
26-6-35	18.50	9.50						9.00			
	131.49	21.58	3.25			1.50	16.78	88.38			
					1892						
14-6-35	31.50		14.50						17.00		
35-6-35	12.30							12.30			
27-6-35	58.20	58.20									
24-5-36	11.00						11.00				
12-5-35	1.39						1.39				
2-5-35	12.73							12.73			
15-6-35	5.00							5.00			
22-6-35	10.00						10.00				
36-6-35	79.41							79.41			
26-6-35	29.66	14.00					15.66				
23-6-35	28.00		20.00				8.00				
1-5-35	1.84							1.84			
	281.03	72.20	34.50				46.05	111.28	17.00		
[fol. 287]					1893						
15-6-35	9.75							9.75			
30-5-37	4.00						4.00				
23-5-36	1.00							1.00			
21-5-36	10.00		10.00								
5-4-37	4.41					4.41					
36-5-36	8.33							8.33			
2-5-35	27.52							27.52			

1-5-35	3.08					3.08		
26-6-35	6.00						6.00	
34-6-35	18.00						18.00	
35-6-35	49.65						49.65	
36-6-35	24.97						24.97	
12-5-35	1.08					1.08		
	167.79		10.00		4.41	8.16	145.22	
				1894				
15-6-35	77.00	28.00	5.00			26.00	18.00	
16-6-35	5.00	5.00						
23-5-36	2.20		2.20					
22-5-36	13.90	6.90				7.00		
26-5-36	6.80					6.80		
2-5-35	4.48					4.48		
3-5-35	10.00					10.00		
12-5-35	3.37					3.37		
36-6-35	17.00						17.00	
[fol. 288]				1894				
35-6-35	9.00						9.00	
18-6-36	10.00	10.00						
14-6-35	10.30		5.30					5.00
26-6-35	6.00					6.00		
1-5-35	7.44						7.44	
35-6-35	0.50						0.50	
13-5-35	1.13		1.13					
	184.12	49.90	13.63			63.65	51.94	5.00

Oregon—Continued

1895

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
16-6-35	19.00	6.00	13.00								
15-6-35	17.00	7.00						10.00			
22-6-35	39.00	12.00	3.00			3.00	12.50	4.50	4.00		
34-6-35	6.00							6.00			
12-5-35	0.24						0.24				
20-5-36	10.40							10.40			
23-5-36	9.10							9.10			
23-6-35	11.00		7.00						4.00		
21-5-36	15.10	7.10					8.00				
14-6-35	6.80	3.00							3.80		
17-5-36	3.90						3.90				
24-6-35	10.00		10.00								
18-5-36	38.30					17.30	21.00				
19-5-36	2.60					2.60					
36-6-35	16.00							16.00			
[fol. 289]					1895						
5-4-36	11.90					11.90					
6-4-36	3.30	3.30									
31-5-36	9.10							9.10			
1-5-35	15.00							15.00			
2-5-35	15.65							15.65			
35-6-35	14.75							14.75			
26-6-35	13.40							13.40			
	287.54	38.40	33.00			34.80	45.64	123.90	11.80		
					1896						
2-5-35	12.19							12.19			
3-5-35	3.00						3.00				
23-6-35	5.50		5.50								
36-6-35	2.00							2.00			

27-6-35	1.00	1.00							
1-5-35	1.03						1.03		
26-6-35	6.00					6.00			
	30.72	1.00	5.50			9.00	15.22		
				1897					
15-6-35	10.50						10.50		
23-5-36	12.20						12.20		
31-5-36	7.60						7.60		
2-5-35	0.28					0.28			
12-5-35	1.00					1.00			
1-5-35	2.44						2.44		
35-6-35	3.50						3.50		
14-6-35	19.10		10.10					9.00	
	56.62		10.10			1.28	36.24	9.00	
[fol. 290]				1898					
15-6-35	9.50						9.50		
25-5-36	6.00				6.00				
26-6-35	4.00	4.00							
2-5-35	1.34						1.34		
13-5-35	2.49					2.49			
36-6-35	11.20						11.20		
1-5-35	3.67					3.67			.33 is Domestic water
12-5-35	3.58					3.58			
35-6-35	11.47						11.47		
	53.25	4.00			6.00	9.74	33.51		
				1899					
12-5-35	0.94					0.94			
1-5-35	5.12						5.12		
26-6-35	1.00	1.00							
	7.06	1.00				0.94	5.12		

Oregon—Continued

1900

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
16–6–35	5.00	5.00									
15–6–35	34.20	19.20						15.00			
25–6–35 (This should be in 15)	0.80	0.80									
5–4–37	1.63					1.63					
22–5–36	4.60	4.60									
30–5–36	36.80	36.80									
31–5–36	8.60	8.60									
1–5–35	11.33							11.33			
12–5–35	1.54						1.54				
35–6–35	1.00						1.00				
[fol. 291]					1900						
2–5–35	4.56							4.56			
3–5–35	35.60	10.00						25.60			
23–6–35	24.70		20.00				4.07				
27–6–35	7.50	3.50						4.00			
24–6–35	3.00		3.00								
26–6–35	29.00						14.00	15.00			
34–6–35	7.50							7.50			
36–6–35	21.64							21.64			
	239.00	88.50	23.00			1.63	21.24	104.63			
					1901						
22–6–35	11.00						11.00				
1–5–35	1.65						1.65				
21–5–36	3.00		3.00								
2–5–35	4.04						4.04				
12–5–35	0.46						0.46				
36–6–35	15.97							15.97			
35–6–35	5.75							5.75			
33–6–35	30.00						15.00	15.00	15 acres waste		
34–6–35	70.62							70.62	16 acres surplus		
	142.49		3.00				32.15	107.34	18.9 acres		

22-6-35	40.50	4.50	19.00		1902		3.00	14.00		
16-6-35	6.00		6.00						In Wash.	
15-6-35	25.50	10.00					11.00	4.50		
22-5-36	6.90						6.90			
26-5-36	6.70					3.00		3.70		
[fol. 292]										
2-5-35	1.12							1.12		
27-6-35	130.00	30.00	20.00	20.00					60.00	
35-6-35	12.18						12.18			
33-6-35	34.10						17.10	17.00	(All surplus)	
	263.00	44.50	45.00	20.00		3.00	50.18	40.32	60.00	
					1903					
32-6-35	181.70			181.70						
33-6-35	18.30						18.30			
34-6-35	50.75							50.75		
13-6-34	80.00			80.00						In Wash.
18-6-35	115.00	40.00		25.00					50.00	In Wash.
23-6-35	1.00		1.00							(30 acres sub irr)
22-6-35	6.50						6.50			
3-5-35	28.94						28.94			(15.3 acres waste)
26-6-35	8.00							8.00		
36-6-35	11.57							11.57		
12-5-35	1.16						1.16			
27-6-36	0.50	0.50								
1-5-35	4.85							4.85		
14-6-35	2.00								2.00	
35-6-35	11.56							11.56		
21-6-34	114.30					25.00	23.00	5.00	61.30	
14-6-34	12.00	12.00								
5-5-35	8.40	8.40								
[fol. 293]										
27-6-34	135.00			135.00						
26-6-34	20.00								20.00	

Oregon—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
1903											
28–6–34	59.00	6.00		53.00							
17–6–35	184.67	13.00		171.67							
18–6–35	250.06			250.06							
13–6–34	147.91			147.91							
23–6–34	62.00			52.00					10.00		
19–6–35	226.50			171.50			40.00		15.00		
24–6–34	429.00			214.00					215.00		
20–6–35	300.00	90.00		210.00							
21–6–35	49.50			49.50							
28–6–35	52.60			52.60							
35–6–35	10.00							10.00			
29–6–35	27.30	10.00					7.30	10.00			
30–6–35	18.97	18.97									
	2,629.04	198.87	1.00	1,793.94		25.00	125.20	111.73	373.30		
1904											
22–6–35	12.00	9.00					3.00				
15–6–35	2.50	2.50									
35–6–35	2.50							2.50			
33–6–35	8.70		8.70							(Waste)	
1–5–35	3.42						3.42				
24–6–35	1.00		1.00								
2–5–35	5.10						5.10				
36–6–35	11.00						11.00				
	46.22	11.50	9.70				22.52	2.50			
[fol. 294] 1905											
30–5–37	6.90						6.90				
25–5–36	14.00							14.00			
1–5–36	13.83			13.83							

2-5-35	5.65							5.65		
26-6-35	13.52							13.52		
35-6-35	18.74							18.74		
34-6-35	6.40							6.40		
36-6-35	10.31							10.31		
3-5-35	24.80						24.80			12.8 acres waste
	114.15			13.83			31.70	68.62		
					1906					
22-6-35	2.00								2.00	.38 acre sub
16-6-35	14.00	14.00								
21-5-36	9.50							9.50		
17-5-36	1.86							1.86		
13-5-35	5.00							5.00		
24-6-35	35.00		35.00							
30-6-36	6.50					6.50				
31-6-36	1.50	1.50								
35-6-35	9.30							9.30		
26-6-35	6.40							6.40		
	91.06	15.50	35.00			6.50		32.06	2.00	
[fol. 295]					1907					
22-6-35	6.00	6.00								
26-6-35	6.00						6.00			
23-5-36	3.30							3.30		
15-6-35	4.00	4.00								
14-6-35	49.00		20.00						29.00	
24-5-36	2.50					2.50				
26-6-35	7.19		7.19							
24-6-35	5.00		5.00							
26-5-36	2.00							2.00		
12-5-35	1.00						1.00			
21-5-36	2.00						2.00			
36-6-35	3.75	3.75								(Waste)
33-6-35	5.00						5.00			(Waste)
	96.74	13.75	32.19			2.50	14.00	5.30	29.00	

Oregon—Continued

1908

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
15–6–35	16.90	16.90									
23–5–36	4.33							4.33			
21–5–36	7.70							7.70			
25–5–36	7.00					7.00					
3–5–35	0.70	0.70									
34–6–35	18.08	18.08									
23–6–35	9.00		5.00						4.00		
31–5–37	5.40						5.40				
7–5–36	0.74	0.74									
[fol. 296]					1908						
4–5–35	13.98					13.98				Waste	
3–5–35	24.86					12.00	12.86			Waste	
1–5–35	3.44							3.44			
12–5–35	1.15						1.15				
35–6–35	32.56							32.56			
26–6–35	103.75	50.00						53.75			
	249.59	86.42	5.00			38.38	14.01	101.78	4.00		
					1909						
23–5–36	5.00							5.00			
24–5–36	0.50						0.50				
4–4–37	3.55							3.55			
24–6–35	87.80		2.80	85.00							
20–5–36	6.86						6.86		See Decree for year (Stipulation)		
13–6–35	213.00			213.00							
	316.71		2.80	298.00			7.36	8.55			
					1910						
27–6–35	33.25							33.25			
	33.25							33.25			

					1912				
36–6–35	105.00			105.00					
1–5–35	85.00			85.00					
34–6–35	181.18							181.18	
35–6–35	71.00							71.00	
26–6–35	5.00							5.00	
27–6–35	116.46	40.00						36.46	40.00
28–6–35	138.00		115.00					23.00	
33–6–35	331.50	15.00	68.00				90.00	138.50	20.00
	1,033.14	55.00	183.00	190.00			90.00	455.14	60.00
[fol. 297]					1913				
27–6–35	70.00						20.00	50.00	
28–6–35	98.00		50.00					10.00	38.00
29–6–35	60.00	35.00							25.00
32–6–35	40.00	10.00		10.00		10.00	10.00		
33–6–35	30.00		20.00						10.00
34–6–35	45.00							45.00	
35–6–35	8.50							8.50	
36–6–35	20.75							20.75	
2–5–35	20.00							20.00	
	392.25	45.00	70.00	10.00		10.00	30.00	154.25	73.00
					1914				
26–6–35	14.00							14.00	
	14.00							14.00	
					1915				
33–6–35	37.00						13.00	24.00	
34–6–35	10.00							10.00	
35–6–35	50.00							50.00	
	97.00						13.00	84.00	

Oregon—Continued

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
					1916						
27-6-35	5.50								5.50		
1-5-35	4.00			4.00							
25-6-35	5.00							5.00		Waste	
36-6-35	4.00							4.00			
26-6-35	10.30						5.30	5.00			
	28.80			4.00			5.30	14.00	5.50		
					1917						
36-6-35	10.00							10.00			
34-6-35	30.00							30.00			
27-6-35	19.00								19.00		
	59.00							40.00	19.00		
[fol. 298]					1918						
34-6-35		18.00						18.00		Waste	
22-6-35	4.00								4.00	Drain & Waste	
26-6-35	14.00	14.00									
	36.00	14.00						18.00	4.00		
					1919						
31-5-36	11.00							11.00			
34-6-35	11.00							11.00			
26-6-35	8.00		8.00								
	30.00		8.00					22.00			
					1920						
35-6-35	2.50							2.50			
25-6-35	20.00	15.00	5.00								

26–6–35	5.00		5.00						
3–5–35	15.00	15.00							
	42.50	30.00	10.00				2.50		
					1921				
21–6–35	12.00					12.00			
	12.00					12.00			
					1922				
33–6–35	20.00		6.00	14.00					Waste
30–5–36	40.00						40.00		
31–5–36	10.00						10.00		
25–6–35	6.00						6.00		Waste
12–5–35	12.00			12.00					
34–6–35	26.00						26.00		20 acres waste
3–5–35	10.00						10.00		
33–6–35	62.00					42.00	20.00		42 acres waste
26–6–35	9.00						9.00		
[fol. 299]					1922				
13–6–35	25.00		25.00						
14–6–35	6.00							6.00	
Permit 5551	10.00	10.00							
Permit 5463	20.00	20.00							
	256.00	30.00	31.00	26.00		42.00	121.00	6.00	
					1923				
18–5–36	10.00						10.00		
25–6–35	50.00					25.00	25.00		
33–6–35	27.00					7.00	20.00		Waste
3–5–35	10.00						10.00		
26–6–35	19.00	5.00	14.00						
7–5–36	4.00	4.00							Waste
23–6–35	15.00		15.00						
18–6–36	10.00			10.00					
13–6–35	27.00							27.00	
Permit 5885	5.00					5.00			
	177.00	9.00	29.00	10.00		37.00	65.00	27.00	

Oregon—Continued

1924

Section	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
5-4-36	5.00			5.00							
6-4-36	8.00			8.00							
31-5-36	9.00	9.00									
34-6-35	10.00							10.00			
Permit 6567	10.00							10.00			
Permit 6753	10.00								No classification		
Permit 6154	10.00								No classification		
[fol. 300]					1924						
Permit 6415	3.00								No classification for these permits		
Permit 6234	14.00										
Permit 6552	7.00										
Permit 7191	5.00										
	91.00	9.00		13.00				20.00			
					1925						
1-5-35	5.00						2.00	3.00			
3-5-35	20.00	3.00				7.00	10.00				
34-6-35	15.00							15.00			
13-6-35	7.00			7.00							
Permit 6947	5.00								No classification		
Permit 7109	10.00								No classification		
	62.00	3.00		7.00		7.00	12.00	18.00			
					1927						
29-6-35	20.00								20.00		
33-6-35	6.00							6.00			
34-6-35	20.00							20.00			
26-6-35	30.90							30.90			
24-6-35	14.00		14.00								
Permit 8212	1.50								No classification		
	92.40		14.00					56.90	20.00		

					1928						
23-5-36	3.00							3.00			
26-5-36	7.50							7.50			
16-6-35	20.00								20.00		
20-6-35	49.00	20.00		9.00					20.00		
21-6-35	193.00	40.00				20.00	64.00	34.00	35.00		
[fol. 301]					1928						
26-6-36	10.00						10.00			Waste	
23-6-35	20.00		10.00						10.00		
	302.50	60.00	10.00	9.00		20.00	74.00	44.50	85.00		
					1929						
23-6-35	30.00		15.00						15.00		
	30.00		15.00						15.00		
					1930						
25-6-35	5.00							5.00			
23-6-35	20.00								20.00		
34-6-35	19.80							19.80			
	44.80							24.80	20.00		
					1931						
18-6-35	1.00	1.00									
	1.00	1.00									
	Acres	1	1D	1R	1RA	2A	2B	3	4	5	6
Grand Total	10,639.72	1,104.11	846.85	2,418.59		243.90	1,360.17	3,554.93	1,045.67		

(Permits) 65.50 acres not classified.

(Here follows 6 photos, folios 302-307.)

SHINGTON EXHIBIT NO. 24

1228 A

Charge to the account of DIVISION OF HYDRAULICS $

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM	☒	FULL RATE	
DAY LETTER		DEFERRED	
NIGHT MESSAGE		NIGHT LETTER	
NIGHT LETTER		WEEK END LETTER	

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

WESTERN UNION

NEWCOMB CARLTON, PRESIDENT

J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK
ACCT'G INFMN.
TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

APRIL 23rd, 1930

RHEA LUPER

STATE ENGINEER

SALEM OREGON

JUST ADVISED ENTIRE WALLA WALLA RIVER BEING DIVERTED AT FREEWATER.

CHAS. J. BARTHOLET

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

WASHINGTON EXHIBIT NO.25

Charge to the account of DIVISION OF HYDRAULICS $ 1228 A

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		FULL RATE	
DAY LETTER	X	DEFERRED	
NIGHT MESSAGE		NIGHT LETTER	
NIGHT LETTER		WEEK END LETTER	

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

WESTERN UNION

NEWCOMB CARLTON, PRESIDENT J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK
ACCT'G INFMN.
TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

APRIL 23rd, 1930

RHEA LUPER

SALEM OREGON

WILL YOU TAKE STEPS TO ENFORCE A MORE ECONOMIC USE OF WATER FROM WALLA WALLA RIVER IN MILTON AND FREEWATER SECTIONS OR CAUSE A REGULATION WHICH WILL GIVE WASHINGTON WATER USERS WATER TO WHICH THEY CLAIM THEY ARE ENTITLED STOP COMPLAINT COMES FROM WATER MASTER AND WALLA WALLA IRRIGATION DISTRICT.

CHAS. J. BARTHOLET

304-305

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

WASHINGTON EXHIBIT NO.26

Charge to the account of $ 1228 A

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		FULL RATE	
DAY LETTER		DEFERRED	
NIGHT MESSAGE		NIGHT LETTER	
NIGHT LETTER		WEEK END LETTER	

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

WESTERN UNION

NEWCOMB CARLTON, PRESIDENT J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK
ACCT'G INFMN.
TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

RECEIVED at 401 Capitol Way, Olympia, Wash.

EA63 43 DL= SALEM ORG 24 336P 1930 APR 24 PM 5 12

CHAS J. BARTHOLET=
OLYMPIA WASH-

BELIEVE IT HAS ALWAYS BEEN CUSTOMARY TO DIVERT IN OREGON THE ENTIRE FLOW OF THE WALLAWALLA RIVER AFTER SUCH DIVERSION RETURN SEPAGE USUALLY HAS SUPPLIED THE

[illegible] STOP WE HAVE NO AUTHORITY WITHOUT COURT which are hereby agreed to

APRIL 23rd, 1930

RHEA LUPER

SALEM OREGON

WILL YOU TAKE STEPS TO ENFORCE A MORE ECONOMIC USE OF WATER FROM WALLA WALLA RIVER IN MILTON AND FREEWATER SECTIONS OR CAUSE A REGULATION WHICH WILL GIVE WASHINGTON WATER USERS WATER TO WHICH THEY CLAIM THEY ARE ENTITLED STOP COMPLAINT COMES FROM WATER MASTER AND WALLA WALLA IRRIGATION DISTRICT.

CHAS. J. BARTHOLET

304-305

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

Charge to the account of WASHINGTON EXHIBIT NO.26 $ 1228 A

CLASS OF SERVICE DESIRED	
DOMESTIC	CABLE
TELEGRAM	FULL RATE
DAY LETTER	DEFERRED
NIGHT MESSAGE	NIGHT LETTER
NIGHT LETTER	WEEK END LETTER

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

WESTERN UNION

NEWCOMB CARLTON, PRESIDENT J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK
ACCT'G INFMN.
TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

RECEIVED at 401 Capitol Way, Olympia, Wash.
EA63 43 DL= SALEM ORG 24 336P 1930 APR 24 PM 5 12

CHAS J. BARTHOLET=
OLYMPIA WASH=

BELIEVE IT HAS ALWAYS BEEN CUSTOMARY TO DIVERT IN OREGON THE ENTIRE FLOW OF THE WALLAWALLA RIVER AFTER SUCH DIVERSION RETURN SEPAGE USUALLY HAS SUPPLIED THE WASHINGTON SIDE WE HAVE NO AUTHORITY WITHOUT COURT ORDER OR COMPACT TO RECOGNIZE RIGHTS OUTSIDE OF STATE=

RHEA LUPER STATE ENGINEER.

IN THE SUPREME COURT OF THE UNITED STATES
October Term, 1933 RS

306-307

WESTERN UNION MESSENGERS ARE AVAILABLE FOR THE DELIVERY OF NOTES AND PACKAGES.

[fol. 308] WASHINGTON EXHIBIT No. 27

Tabulation of Administration of Related Stream System in Washington for Years 1929, 1930, 1931, 1932, and 1933

By Harlow Barney, Watermaster

[fol. 309] 1929 Administration of Related Stream System in Washington, by Harlow Barney, Water Master

June 1 to 10—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed June 1 to 10:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
1013.57	221.94	912.01	253.80	.....	123.00

June 11 to 18—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and West Walla Walla River.

Acres closed June 11 to 18:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
1217.36	.....	.....	1525.96	526.70	.....

[fol. 310] 1930 Administration of Related Stream System in Washington by Harlow Barney, Water Master

June 10 to 19—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed June 10 to 19:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
1013.57	221.94	912.01	203.80	.....	123.00

June 25 to July 6—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and West Walla Walla River.

Acres closed June 25 to July 6:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
1217.36	.....	.....	1525.96	526.70	.....

[fol. 311] 1931 Administration of Related Stream System in Washington by Harlow Barney, Water Master

May 26 to 30—All rights subsequent to 1894 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; East Little Walla Walla River; and Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed May 26 to 30:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
967.57	221.94	905.01	253.80	.....	111.00

May 30 to June 3—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; East Walla Walla River; and Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed May 30 to June 3:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
46.00	.....	7.00	.....	.....	12.00

June 3 to 7—All other rights subsequent to 1894 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on the Walla Walla River; and West Little Walla Walla River.

Acres closed June 3 to 7:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W River	East W. W. River
1054.36	.....	.....	1525.96	339.00	.....

[fol. 312] 1931 Administration of Related Stream System in Washington by Harlow Barney, Water Master (Continued)

June 3 to 10—All other rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed June 3 to 10:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
163.00	.....	.....	431.96	187.70	.....

[fol. 313] 1932 Administration of Related Stream System in Washington by Harlow Barney, Water Master

June 27 to 30—All rights subsequent to 1904 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed June 27 to 30:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
455.10	150.28	535.71	253.80	.....	.....

July 9 to 12—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and East Walla Walla River.

Acres closed July 9 to 12:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
558.47	71.66	376.30	.....	.....	123.00

July 12 to 16—All rights subsequent to 1904 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River; and West Walla Walla River.

Acres closed July 12 to 16:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
247.70	.....	.....	1029.00	286.00	.....

[fol. 314] 1932 Administration of Related Stream System in Washington by Harlow Barney, Water Master (Continued)

July 12 to 16—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 12 to 16:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
969.66	.....	.....	496.96	240.70	.....

[fol. 315] 1933 Administration of Related Stream System in Washington by Harlow Barney, Water Master

July 9 to 12—All rights subsequent to 1904 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; and Walla Walla River above the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 9 to 12:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
455.10	150.28	535.71	253.80	.....	14.30

July 12 to 16—All rights subsequent to 1892 were closed on Mill Creek above Gose Street: Garrison Creek; Yellowhawk Creek; and Walla Walla River above L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 12 to 16:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
558.47	71.66	376.30	.....	.....	123.00

July 18 to 22—All rights subsequent to 1892 were closed on Mill Creek below Gose Street: Walla Walla River below the L. O. Kennedy Memorial Concrete Bridge on Walla Walla River.

Acres closed July 18 to 22:

Mill Creek	Garrison	Yellow-Hawk	W. W. River	West W. W. River	East W. W. River
1217.36	.....	.....	1525.96	526.70	.....

[fol. 316] WASHINGTON EXHIBIT No. 28

[Title omitted]

Abstracts of Permits Nos. U-2, U-4, U-40, U-45, U-47, U-65 and U-68 Involving Water from Wells in the State of Oregon

(Here follow 7 photos, folios 317-323)

Abstract of Permit No. U - 2

208A

Application No. U-2 *Certificate No.* ⁻ 9102

ame Milton Nursery Company

ddress Milton, Oregon.

urce of water supply A well, appr. 1½ mi. from Walla Walla River - Tum A Lum Branch tributary of Columbia River

e Irrigation

int of diversion NW¼NW¼SE¼, Section 31, Township 6 North, Range 36 East, W. M.

ame of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

p.	Range	Sec.	NE ¼				NW ¼				SW ¼				SE ¼			
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
	36 E	31			30	10				40	20	35	4			1		

iority date December 3, 1927.

ount of water 1.75 cubic feet per second.

me limit to begin construction

me limit to complete construction ***extended to***

me limit to completely apply water ***extended to***

marks:

317

208B

Abstract of Permit No. U-4

Application No. U-4 *Certificate No.* 10085

Name C. H. Harris

Address Milton, Oregon

Source of water supply A well, tributary of Walla Walla River

Use Supplemental irrigation

Point of diversion SW¼SW¼, Section 27, Township 6 North, Range 35 East, W. M.

Name of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

Twp.	Range	Sec.	NE¼				NW¼				SW¼				SE¼			
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
6 N	35 E	27											30					

Priority date March 26, 1928;

Amount of water 0.38 cubic foot per second.

Time limit to begin construction

Time limit to complete construction *extended to*

Time limit to completely apply water *extended to*

Remarks:

318

208

Abstract of Permit No. U - 40

Application No. U-45 *Certificate No.*

ame O. I. Hittle

ddress Freewater, Oregon

ource of water supply A well, tributary of Walla Walla River

se Irrigation

oint of diversion SE¼SE¼SE¼, Section 23, Township 6 North, Range 35 East, W. M.

ame of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

			NE¼				NW¼				SW¼				SE¼			
p.	Range	Sec.	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
N	35 E	23																20

riority date December 15, 1930

mount of water 0.25 cubic foot per second

me limit to begin construction December 31, 1931

me limit to complete construction October 1, 1932 *extended to*

e limit to completely apply water October 1, 1933 *extended to* October 1, 1934

marks:

319

2080

Abstract of Permit No. U - 45

Application No. U-52 *Certificate No.* 9757

Name C. H. Harris

Address Milton, Oregon

Source of water supply Well, tributary of Hudson Bay Ditch, tributary of Walla Walla River

Use irrigation

Point of diversion NW¼NW¼, Section 2, Township 5 North, Range 35 East, W. M.

Name of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

Twp.	Range	Sec.	NE ¼				NW ¼				SW ¼				SE ¼			
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
5 N	35 E	2						10										

Priority date March 7, 1931

Amount of water 0.12 cubic foot per second.

Time limit to begin construction

Time limit to complete construction *extended to*

Time limit to completely apply water *extended to* 320

Remarks:

Abstract of Permit No. U - 47

Application No. U-54 *Certificate No.*

Name Phillip S. Gibbons, Sr. and Phillip S. Gibbons, Jr.

Address Freewater, Oregon

Source of water supply A well, tributary of Hudson Bay and Pleasantview canals

Jse Irrigation

Point of diversion NW¼NW¼, Section 2, Township 5 North, Range 35 East, W. M.

lame of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

wp.	Range	Sec.	NE ¼				NW ¼				SW ¼				SE ¼			
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
N	35 E	2						20										

iority date April 2, 1931

nount of water 0.25 cubic foot per second

me limit to begin construction May 29, 1932

ne limit to complete construction October 1, 1933 *extended to*

ne limit to completely apply water October 1, 1934 *extended to* 321

marks:

208F

Abstract of Permit No. U - 65

Application No. U-74 *Certificate No.*

Name R. E. Heskett

Address Freewater, Oregon

Source of water supply a well, tributary of Walla Walla River

Use irrigation

Point of diversion SE¼NW¼NE¼, Section 33, Township 6 North, Range 35 East, W. M

Name of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

Twp.	Range	Sec.	NE ¼				NW ¼				SW ¼				SE ¼			
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
6 N	35 E	33		20														

Priority date December 18, 1931

Amount of water 0.25 cubic foot per second

Time limit to begin construction March 3, 1933

Time limit to complete construction October 1, 1934 *extended to*

Time limit to completely apply water October 1, 1935 *extended to* 322

Remarks:

Abstract of Permit No. U-68 2086

Application No. U-76 *Certificate No.*

Name Scott Redfearn

Address Freewater, Oregon

Source of water supply a well, tributary of Tumalum Branch of Walla Walla River

Use Irrigation

Point of diversion NE¼NW¼, Section 36, Township 6 North, Range 35 East, W. M.

Name of ditch or reservoir

DESCRIPTION OF LAND TO BE IRRIGATED OR PLACE OF USE

Twp.	Range	Sec.	NE¼				NW¼				SW¼				SE¼			
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
6 N	35 E	36					8											

Priority date February 27, 1932

Amount of water 0.10 cubic foot per second

Time limit to begin construction May 16, 1933

Time limit to complete construction October 1, 1934 *extended to*

323

Time limit to completely apply water October 1, 1935 *extended to*

Remarks:

[fol. 324] **WASHINGTON EXHIBIT No. 29**

Tabulation of Approximately 80% of the Wells in the Related Area in Oregon, Giving Names of Operators, Location, Date Dug, Power Used for Pumping, and Other Data

NOTE.—The datum herein was secured by representatives of the State of Oregon and of the State of Washington, and is based upon inquiry from those thought to be best qualified to give the information sought. The dates set out are approximate only.

[fol. 325]

I

According to Location

Section 1, Township 5 N., Range 35 E. W. M.

Name	Location	Date Dug	Date Deepened	Power Used		First Used
				Gasoline	Electric	
R. C. Sheets	NW/NW	1914			1914	1914
R. C. Sheets	NW/NW	1930			1930	1930
Waggoner, Mr.	NW/NW	1919			1919	1919
Mr. Howton	NW/NW	1918			1918	1918
Mrs. John Clark	NW/NW	1916		1916 to 1918	1918	1916
Harry Bets	NW/NW	1923	1929	1923 to 1929	1929	1923
George Massie	SE/NW	1913			1913	1913
F. S. Phelps	NE/NW	1906	1914	1927	1927	1906
Aaron Miller	SE/NW	1929			1929	1929
Ida Philips	SW/NW	1934	Not used yet			
Milton Nursery Co.	SE/NE	1925			1925	1925
	2–5–35					
E. J. McSherry	NE/NW	1915		to 1931	1931	1915
	3–5–35					
Bruce Shangle	NW/NW	1921	1932		1921	1921
Bruce Shangle	NW/NW	1918			1928	1928
J. E. Irons	NE/NW	1912	1931		1912	1912
N. W. Mumford	NE/NW	1910			1910	1910
Mrs. A. H. Carter	NW/NE	1910				
Jack Dougherty	SW/NE	1900		1909		1909
John Ballot	SE/NW	1917	drilled 1931	to 1927	1927	1917
Conser Rhea	NW/SE	1909			1909	1909
C. L. Ringer	NE/NE	1904		1904		1904
	31–6–36					
Milton Nursery Co.	NW/NW/SE	1930			1930	1930
Anna Fields	NW/NW	1910		1910		1910

	36–6–36					
Ed Means	SW/SE	1920	drilled 1921	to 1925	1925	1920
W. M. Hayter	SE/SW	1910	1926	1930	1930	1910
Oberholtzer, Mr.	SE/NE	1923		to 1928	1928	1923
Martha Bostwick	NW/NE	1923	drilled 1930	to 1930	1930	1923
O. F. Hubbs	SW/NE	1912	drilled 1930	to 1915	1930	1912
Redfern Bros.	NE/NW	1931	Not used since dug.			
Millard Grogan	SW/NW	1925	drilled 1930	to 1931	1931	1927
	35–6–35					
W. W. Roeder	NW/NW	1900	drilled 1929		1900	1900
W. F. Eiffert	NW/NW	1913	1928	to 1916	1916	1913
C. H. Harris	SW/SW	1910			1910	1910
[fol. 327]						
C. H. Harris	SW/SW	1910			1910	1910
C. H. Harris	SW/SW	1930	drilled 1930		1930	never used
C. H. Harris	SW/SW	1927			1927	1927
Dr. Montgomery	SW/SW	1911			1911	1911
John Barnes	SW/SW	1920			1922	1922
W. C. Ownby	SW/SW	1912	1932	to 1914	1914	1912
Otto Spragg	NW/SW	1912	Prior 1930		1914	1914
W. H. Coghill	SW/NW	1916		to 1921	1921	1916
C. H. Harris	SW/NW	1916			1916	1916
Dan Herndon	SW/NW	1919	1930	to 1921	1921	1919
Karl Ganz	NW/NW	1932	Not used			
Alta Rogers	SW/NW	1910	1916		1910	1910
Elba Rogers	SW/NE	1923	drilled 1925	to 1925		1923
Elba Rogers	SW/NE	1907	drilled 1931	to 1931	1931	1908
Ivan Rogers	SW/NE	1914		to 1918		1914
George Shortrige	SW/NE	1920		to 1923		1920
John Roloff	NE/NE	1912	Never used			
Richenberg Est.	NW/NE	1928	1931		1928	1928
T. O. Goodwin	NW/NE	1914	drilled 1931	to 1925	1925	1914
Alta Rogers	SW/NE	1909	1927	to 1927	1927	1909
John McAuslin	SW/NE	1908	1930	to 1926	1926	1910

Name	Location	Date Dug	Date Deepened	Power Used		First Used
				Gasoline	Electric	
	35–6–35 (Continued)					
Clay Grogan	SE/SW	1902	1926		1926	1926
W. A. Gent	SE/SW	1903	1922	to 1920	1920	1903
	34–6–35					
Sam Brinker	NW/NW	1922	drilled 1923		1922	1922
John H. Brinker	NW/NW	1925	1926		1925	1925
Lottie M. Knight	NE/NW	1908		to 1910	1910	1908
John H. Brinker	NW/NW	1908			1908	1908
J. A. Reese	NE/NW	Prior 1928	1931		1928	1928
Ned Feigner	NW/NE	1914	1918		1914	1914
I. C. Jackson	NE/NE	1912	1931		1912	1912
Roy Zent	SW/NW	1920	1926	to 1925	1925	1920
Jacob Hess	NW/NW	1922			1922	1922
State of Oregon	SW/NW	1908			Now	1908
State of Oregon	SW/NW	1922			1922	1922
John H. Brinker	SW/NW	1908	1928	to 1924	1924	1908
George H. Bishop	SW/SW	1909		to 1917	1917	1909
George H. Bishop	SW/SW	1920			1920	1920
Joe Dykes	NW/SW	1916	1928	to 1920	1920	1917
Andrew Miller	NW/SW	1917	1923	to 1918	1918	1917
Herman Saeger	SW/SW	1914	1931		1914	1914
Geo. J. Henry Est.	NW/SW	1914	drilled 1928	1914		1914
Mrs. J. C. McKenzie	SE/SW	1920	1926		1920	1920
Lawrence Divinick	SE/SW	1921	1928		1921	1921
David Bier	SE/SW	1909	1932		1910	1910
C. N. Rogers	SW/SE	1913	various times		1917	1917
S. S. Shields	SE/SW	1908	1924	to 1912	1912	1908
E. P. Jensen	SE/SE	1908	1918		1908	1908
A. M. Leonard	SE/SE	1920	1925	to 1923	1923	1920

[fol. 328]

C. W. Darby	SE/SE	1907		to 1911	1911	1907
J. J. Cowart	SE/SE	1916	1932	to 1921	1921	1916
J. H. Piper	NE/SE	1907	1930		1907	1907
Groth Est.	NE/SE	1909	1928		1909	1909
Gladys Delahaye	SE/NW	1922		1923	1923	1922
N. W. King	SE/NW	1923	1932	to 1931	1931	1923
Wm. Morris	SE/NW	1910	?		1910	1910
Wm. Morris	NE/SW	1921		1921		1921
Henry Graham	NE/NW	Prior 1913	1920		1913	?
Carl Raugust	SW/NE	1911	1929		1911	1911
Wm. Forsythe	SE/NE	1899		1901 to 1908	1908	1901
Wm. Forsythe	SW/NE	1909			1909	1909
A. Feigner	SE/NE	1910			1911	1911
Wm. Forsythe	SW/NE	1922	1925		1922	1922
Wm. Forsythe	SW/NE	1926			1926	1926
A. Feigner	NW/NE	1929	drilled 1930		1929	1929
Henry Eiffert	NE/NE	1910			1910	1910
A. Feigner	NW/NE	1927			1927	1927
C. N. Snow	NE/NE	1928			1928	1928
Herbert Tanke	NW/SE	1920	1924		1920	1920
W. G. Hufford	SE/SE	1919			1919	1919
S. S. Shields	SW/SE	1920	1925		1925	1920
Mr. C. J. McKenzie	SE/SW	1931	1932		1931	1931
E. R. Rice	SW/SE	1909	1928	to 1917	1917	1909

33–6–35

W. R. Bookart	NE/NW	1926	drilled 1926	1926		1926
Mrs. Martha Ely	NW/NW	1922	1924		1922	1922
C. O. Wheeler	SW/NW	1923	1926		1923	1923
Howard Dunlap	SW/NW	1922	1932		1922	1922
Farmers Brokerage Co.	NW/SW	1921	drilled 1921		1921	1921
Virgil Carter	NE/SW	1915	1922	to 1922	1922	1915
Farmers Brokerage Co.	NW/SW	1921	drilled 1921		1921	1921
Art Redfern	SE/NW	1920	drilled 1930		1920	1920
Catherine Potts	NE/SW	1922	drilled 1923		1922	1922

Name	Location	Date Dug	Date Deepened	Power Used Gasoline	Power Used Electric	First Used
	34–6–35 (Continued)					
Joe Piscallio	SE/NW	1912	drilled 1928		1912	1912
H. Clovis	NE/SW	1919	drilled 1924		1919	1919
W. W. Wasser	NW/SE	1909	1927	to 1927	1927	1909
W. W. Wasser	NW/SE	1914	1927		1914	1914
Mrs. May Vincent	NW/SE	1919	1927	to 1920	1920	1919
T. A. Williams	SW/NE	1922	1930		1927	1922
Hattie Robison	NE/SE	1918	1925		1918	1918
Shields Fruit Co.	SE/SE	1909	1924		1909	1909
Shields Fruit Co.	NE/SE	1909	drilled 1924	to 1924	1924	1909
Shields Fruit Co.	NE/SE	1912	drilled 1924		1912	1912
John McEwan	SE/SE	1910	1925 & 1930		1910	1910
H. S. Shangle	SW/SE	1920			1920	1920
H. S. Shangle	SE/SW	1915			1915	1915
Carl Ulbricht	SE/NE	1913			1913	1913
C. P. Collins	SE/NW	Prior 1923	drilled 1928		1928	1923
W. V. Staley	SE/NE	1908	1913		1919	1919
Edith Halsey	SE/NE	1922	drilled 1933		1922	1922
N. A. Davis	NE/NE	1932	1932		1932	1932
[fol. 329]						
	32–6–35					
Farmers Brokerage Co.	SE/NE	1931			1931	1931
	30–6–35					
M. F. Hubbs	SW/SW	1931			1932	1910
Henry Grogan	SW/SW	1910	drilled 1930	to 1930	1930	1910
Dan Colley	SW/SW	1910	prior to 1930	to 1930	1930	1910
N. A. Heidenrich	NW/NW	drilled 1928			1928	1928

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Mrs. C. L. Greer	SW/SE	prior to 1913			1913	1913
Mary McCoy	SE/NE	1920		1920		1920
H. M. Williams	NE/NW	1918	drilled 1925		1925	1925
D. Goodwin	NW/NE	1923		to 1932	1932	1924
T. A. Town	NE/NW	1916	1929	1916		1916
D. Goodwin	NW/NE	prior to 1914	drilled 1931	to 1931	1931	1914
Mrs. Mike Barth	SE/NW	1932	drilled 1932		1932	1932
Louis Keen	SE/NW	prior to 1918	drilled 1929		1918	1918
W. A. Harshfield	NE/SW	1921		to 1925	1925	1921
Alex Duff	SE/NW	drilled 1925		1925		1925
J. P. Tolen	NW/SW	1908	drilled 1916	to 1912	1912	1908
Alex Duff	SW/NW	1921	drilled 1923		1921	1921
Val Hoffman	NE/SW	1916			1916	1916
L. P. Petty	NE/SW	1918			1918	1918
Mrs. Ruth Smith	NW/SW	prior to 1923	1925 & 1927	to 1928	1928	1924
U. H. Hayden	SE/SW	prior to 1915	drilled 1930	to 1925	1925	1919
P. S. Broewer	SE/SW	1916	1917	1916		1916
Jerome Hill	SW/SW	1916	1931	1917		1917
Roy Records	SW/SW	1919	1919	1919		1919
J. L. Blanchard	NW/SW	1911	1928		1911	1911
S. J. Bowman	NW/SW	1920	1929		1920	1920
Joe Bono	NE/NW	drilled 1929			1930	1930
N. F. Cole	NW/NW	drilled 1929			1930	1930
N. Clearkin	NW/NW	drilled 1929			1930	1930
M. J. Bentley	NW/NW	1926	drilled 1930		1931	1931
Mrs. Howell	NW/NW	1920			1920	1920
George Ransom	SW/NW	1926	drilled 1930		1926	1926
H. D. Starkel	SE/SE	drilled 1926		to 1930	1930	1926
W. S. Grogan	SE/SE	drilled 1926	1930	to 1928	1928	1927

[fol. 330]

A. L. Coffey	NE/SE	1910	1930		1910	1910
Issiac Hartzell	NW/SW	1916			1916	1916
A. E. Hull	SE/NE	1906	drilled 1930	1906		1906

Name	Location	Date Dug	Date Deepened	Power Used		First Used
				Gasoline	Electric	
	26–6–35					
C. E. Anderson	NE/NE	1916	drilled 1920	to 1926	1926	1916
I. N. Ransom	SE/NE	1910	drilled 1926		1910	1910
J. J. Williams	NE/NE	1908	drilled 1920	to 1919	1919	1908
I. W. Treanor	NE/NE	1928			1929	1929
Edyth Didion	NE/NE	1914	1930		1914	1914
M. G. Bently	NW/NE	1910	drilled 1930		1928	1928
F. C. Parr	NW/NE	1908	1912 & 1913	1908		1908
F. C. Parr	NW/NE	1918		1918		1918
Fred McElrath	NE/NW	1904	drilled 1932	to 1932	1932	1904
Frank Derrick	SW/SW	1929	drilled 1930		1929	1929
M. Cook	SW/SW	1931	Being completed, Permit Well			
Orville Bowers	SW/NW	1912	drilled 1921		1912	1912
Jennie Brooks	SW/NW	1906	drilled 1929	to 1929	1929	1906
George Wharton	NE/SW	1906		?	?	1906
Farm Brokerage Co.	SE/NW	1904	drilled 1920	to 1920	1920	1904
A. Avey	SE/NW	1900	1926	to 1926	1926	1900
Broestler, Mr.	NE/NW	1914	drilled 1916		1914	1914
Chas. Walden	NE/SW	1890	1925 & 1926		1926	1926
Henry Shackleford	SE/SW	1905	1930		1926	1905
A. C. Franklin	SW/NE	1902	1931		1931	1931
C. F. Otto	SW/NW	1915	drilled 1915	to 1930	1930	1915
W. A. Propeck	NE/SW	1904	1930	to 1930	1930	1904
W. A. Propeck	SW/SE	1914	1924 & 1931	to 1924	1924	1914
J. J. Knight	SW/SW	1928	drilled 1930	to 1931	1931	1928
Otto Jackel	SE/SE	1890	1930	to 1930	1930	1930
J. A. Hughes	SW/SE	1915	drilled 1931		1915	1915
	27–6–35					
Chas. Schwald	SE/NE	1913	1918	to 1921	1921	1913
John F. Pitman	NE/SW	1911	drilled 1930		1913	1913

C. M. Bixby	NW/NW	1912			1912	1912
Jack Irons	NE/SW	1923	drilled 1923		1923	1923
R. S. Bixby	NE/SW	1920			1920	1920
Ed Lefor	NW/SW	1909 & 1910	1920	1920	to 1920	1910
C. H. Harris	SW/SW	1910	drilled 1930		1910	1910
C. H. Harris	SW/SW	drilled 1927			1927	1927
G. E. Allen	SE/SW	1909	1930		1909	1909
G. F. Bline	SE/SW	prior 1913	1930		1913	prior 1913
Tassie Stewart	Refused to give any information					
Frank McSherry	SW/SE	1922	1930 & 1931		1922	1922
Frank Derrick	SE/SE	1912			1912	1912
Mrs. Anna Sargent	SE/SE	1921	drilled 1923		1921	1921
George Wilson	SE/SE	1920		to 1930	1930	1920
Wm. Roth	NE/SE	1913	drilled 1918	to 1921	1921	1913
Mrs. J. F. Slover	NW/SE	1910			1910	1910
Tassie Stewart	NW/SE	1920			1920	1920
Tassie Stewart	NW/SE	1920			1920	1920
G. F. Bline	SE/SW	1924	1930		1924	1924

[fol. 331]

28–6–35

Walter J. Rand	SE/NE	1931	drilled 1932	1933		1933
Walter J. Rand	SE/NE	1931		1931		1931
J. H. Barrie	NE/SE	1921	1930	to 1930	1930	1921
J. N. Hanson	SE/SE	1914	drilled 1929		1914	1914
J. N. Hanson	SE/SE	1922	drilled 1922		1922	1922

29–6–35

W. S. Edwards	NE/SE	1926			1926	1926
L. R. Edwards	NW/SE	1909	1933		1909	1909
R. E. Edwards	SW/NE	1933	1933		1933	1933
R. E. Hockett	NE/NE	1917	drilled 1927	to 1924	1924	1917
Henry Rouse	NW/NE	1917	drilled 1930		1917	1917
Henry Rouse	NW/NE	1932	Not used.			

Name	Location	Date Dug	Date	Power Used		First Used
			Deepened	Gasoline	Electric	
	24–6–35					
Everett S. Miller	SW/SE	1923	drilled 1925 & 1931	to 1928	1928	1923
	21–6–35					
E. A. Waltz	SE/NE	1921	drilled 1923	1921		1921
Otto Benkhe	SE/NE	1930	1931–1932–1930	1930		1930
A. C. Conrad	NW/NE	1910	1911	1910	1911	1910
Albert Olson	SW/NE	1926	drilled 1927		1926	1926
G. J. Haasch	SW/NE	1926	drilled 1927		1926	1926
John Bade	SW/NW	1904	1914	to 1905	1905	1904
John Bade	SW/NW	1929		1929		1929
J. E. Alexander	SW/SW	1929	Not sufficient water to irrigate			
J. E. Alexander	SW/SW	1931	Not sufficient water to irrigate			
	20–6–35					
Wm. Jackson	SW/SE	1919			1919	1919
	14–6–35					
Conrad Miller	NE/SW	1921	1923	1921		1921
	16–6–35					
Sarah West	NW/SE	1934		Not completed		
J. B. Rankin	NW/SE	1930		1930		1930
Chas. Rand	SE/SW	1914		1926	to 1926	1914
Chas. Rand	SE/SW	1910		1933		1933

[fol. 332]

II

According to Date

When First Dug

Name	Year	Location
[fol. 333]	1890	
Otto Jackell		26-6-36
Chas. Walden		26-6-35
	1899	
William Forsythe		34-6-35
	1900	
A. Avey		26-6-35
W. W. Roeder		35-6-35
Jack Dougherty		3-5-35
	1901	
	None	
	1902	
A. C. Franklin		26-6-35
Clay Grogan		35-6-35
	1903	
W. A. Gent		35-6-35
[fol. 334]	1904	
C. L. Ringer		3-5-35
John Bade		29-6-35
Fred McElrath		26-6-35
W. A. Propeck		26-6-35
Farmers Brokerage Co.		26-6-35
	1905	
Henry Shackleford		26-6-35
	1906	
F. G. Phelps		1-5-35
Jenny Brooks		26-6-35
George Wharton		26-6-35
A. E. Hull		26-6-35
	1907	
Elba Rogers		35-6-35
G. W. Darby		34-6-35
J. H. Piper		34-6-35

Name	Year	Location
	1908	
John McAuslin		35-6-35
Lottie McKnight		34-6-35
John H. Brinker (N. W./N. W.)		34-6-35
State of Oregon		34-6-35
John Brinker (S. W./N. W.)		34-6-35
S. S. Shields		34-6-35
E. P. Jensen		34-6-35
W. V. Staley		33-6-35
J. G. Tolen		33-6-35
F. C. Parr		26-6-35
J. J. Williams		26-6-35
[fol. 335]	1909	
Ed Lefor		27-6-35
G. E. Allen		27-6-35
Alta Rogers		35-6-35
Conser Rhea		3-5-35
William Forsythe		34-6-35
Geo. H. Bishop		34-6-35
David Bier		34-6-35
Groth Est.		34-6-35
L. P. Edwards		29-6-35
W. W. Wasser		33-6-35
Shields Fruit Co.		33-6-35
Shields Fruit Co.		33-6-35
E. R. Rice		34-6-35
	1910	
C. H. Harris		27-6-35
J. F. Slover		27-6-35
C. H. Harris		35-6-35
C. H. Harris		35-6-35
Alta Rogers		35-6-35
W. M. Hayter		36-6-35
Anna Fields		31-6-36
N. W. Mumford		3-5-35
A. H. Carter		3-5-35
William Morris		34-6-35
A. Feigner		34-6-35
Henry Eiffert		34-6-35
A. C. Conrad		21-6-35
Chas. Rand		21-6-35

Name	Year	Location
John McEwan		33-6-35
Henry Grogan		30-6-35
Dan Colley		30-6-35
F. W. Ransom		26-6-35
A. L. Colley		26-6-35
W. G. Bently		26-6-35
	1911	
Dr. Montgomery		35-6-35
John F. Pitman		27-6-35
Carl Raugust		34-6-35
J. L. Blanchard		25-6-35
[fol. 336]	1912	
W. C. Ownby		35-6-35
Otto Spragg		35-6-35
John Roloff		35-6-35
J. E. Irons		3-5-35
O. F. Hubbs		26-6-35
C. M. Bixby		27-6-35
Frank Derrick		27-6-35
I. C. Jackson		34-6-35
Joe Piscallio		33-6-35
Shields Fruit Co.		33-6-35
Orville Bowers		26-6-35
	1913	
W. F. Eiffert		35-6-35
George Massie		1-5-35
Charles Schwald		27-6-35
G. F. Bline		27-6-35
C. N. Rogers		34-6-35
Henry Graham		34-6-35
Carl Ulbricht		33-6-35
Mrs. C. L. Grier		25-6-35
Wm. Roth		27-6-35
	1914	
Ivan Rogers		35-6-35
R. C. Sheets		1-5-35
J. N. Hanson		28-6-35
Ned Feignor		34-6-35
Herman Saager		34-6-35
Geo. Henry Est.		34-6-35

Name	Year	Location
W. W. Wasser		33-6-35
Chas. Rand		21-6-35
D. Goodwin		25-6-35
Edyth Dideon		26-6-35
Mr. Broestler		26-6-35
W. A. Propeck		26-6-35
T. O. Goodwin		35-6-35
	1915	
E. J. McSherry		2-5-35
C. F. Otto		26-6-35
J. A. Hughes		26-6-35
U. H. Hayden		25-6-35
Virgil Carter		33-6-35
H. S. Shangle		33-6-35
[fol. 337]	1916	
Joe Dykes		34-6-35
J. J. Cowart		34-6-35
W. H. Coghill		34-6-35
C. H. Harris		35-6-35
Mrs. John Clark		1-5-35
T. A. Town		25-6-35
Val Hoffman		25-6-35
P. S. Broewer		25-6-35
Jerome Hill		25-6-35
Issiac Hartzell		26-6-35
C. E. Anderson		26-6-35
	1917	
Andrew Miller		34-6-35
John Balliot		3-5-35
R. E. Heskett		29-6-35
Henry Rouse		29-6-35
	1918	
Bruce Shangle		3-5-35
Louis Howton		1-5-35
H. M. Williams		25-6-35
Louis Keen		25-6-35
L. R. Petty		25-6-35
F. C. Parr		26-6-35
Hattie Robinson		33-6-35

Name	Year	Location
	1919	
W. G. Hufford		34-6-35
Dan Herndon		35-6-35
Mr. Waggoner		1-5-35
Wm. Jackson		20-6-35
Roy Records		25-6-35
H. Clovis		33-6-35
Mrs. May Vincent		33-6-35
	1920	
Ed. Means		36-6-35
John Barnes		35-6-35
George Shortridge		35-6-35
Herbert Tanke		34-6-35
Roy Zent		34-6-35
[fol. 338] Geo. H. Bishop		34-6-35
Mrs. J. C. McKenzie		34-6-35
A. M. Leonard		34-6-35
R. S. Bixby		27-6-35
George Wilson		27-6-35
Tassie Stewart		27-6-35
Tassie Stewart		27-6-35
Art Redfern		33-6-35
H. S. Shangle		33-6-35
Mary McCoy		25-6-35
S. J. Bowman		25-6-35
Mrs. Howell		25-6-35
George Shortridge		35-6-35
	1921	
Bruce Shangle		3-5-35
J. H. Barnes		28-6-35
Lawrence Divinick		34-6-35
William Morris		34-6-35
Conrad Miller		14-6-35
Farmers Brokerage Co.		33-6-35
Farmers Brokerage Co.		33-6-35
E. A. Waltz		21-6-35
W. A. Harshfield		25-6-35
Alex Duff		25-6-35
Mrs. Anna Sargent		27-6-35
	1922	
Fred McSherry		27-6-35
J. N. Hanson		28-6-35

Name	Year	Location
Sam Brinker		34-6-35
Jacob Hess		34-6-35
State of Oregon		34-6-35
Gladys Delahaye		34-6-35
William Forsythe		34-6-35
Mrs. Martha Eby		33-6-35
Howard Danlop		33-6-35
Catherine Potts		33-6-35
T. A. Williams		33-6-35
Edith Halsey		33-6-35
	1923	
Jack Irons		27-6-35
N. V. King		34-6-35
Harry Betz		1-5-35
Martha Bostwick		36-6-35
Mr. Oberholtzer		36-6-35
Elba Rogers		35-6-35
Everett Miller		24-6-35
C. D. Wheeler		33-6-35
C. P. Collins		33-6-35
D. Goodwin		25-6-35
Mrs. Ruth Smith		25-6-35
[fol. 339]	1924	
G. F. Bline		27-6-35
	1925	
John H. Brinker		34-6-35
Milton Nursery Co.		1-5-35
William Grogan		36-6-35
Alex Duff		25-6-35
	1926	
William Forsythe		34-6-35
H. R. Bookart		33-6-35
Albert Olsen		21-6-35
G. J. Haasch		21-6-35
W. S. Edwards		29-6-35
M. J. Bently		25-6-35
George Ransom		25-6-35
H. D. Starkel		25-6-35
W. G. Grogan		25-6-35

Name	Year	Location
	1927	
C. H. Harris		35-6-35
C. H. Harris		27-6-35
A. Feigner		34-6-35
	1928	
Rickenburg Est.		35-6-35
J. A. Reese		34-6-35
M. A. Heidenrich		30-6-36
I. W. Treanor		26-6-35
J. J. Knight		26-6-35
	1929	
A. Feigner		34-6-35
Aaron Miller		1-5-35
John Bade		21-6-35
J. E. Alexander		21-6-35
Joe Bono		25-6-35
N. P. Cole		25-6-35
N. Clearken		25-6-35
Frank Derrick		26-6-35
[fol. 340]	1930	
R. C. Sheets		1-5-35
Otto Benkhe		21-6-36
J. B. Rankin		16-6-35
Milton Nursery Co.		31-6-36
C. H. Harris		35-6-35
	1931	
Mrs. C. J. McKenzie		34-6-35
Walter Rand		28-6-35
Walter Rand		28-6-35
Redfern Bros.		36-6-35
Farmers Brokerage Co.		32-6-35
M. F. Hubbs		30-6-35
M. Cook		26-6-35
J. E. Alexander		21-6-35
	1932	
Henry Rouse		29-6-35
N. A. Davis		33-6-35
Mrs. Mike Barth		25-6-35
	1933	
R. E. Edwards		29-6-35
	1934	
Ida Phillips		1-5-35
Sarah West		16-6-35

[fol. 341] WASHINGTON EXHIBIT No. 30

[Title omitted]

Tables—Nos. I, II, IIa, III, IV, IVa, V, VI, VIa, VIb, and VII Showing Engineering Studies of the Walla Walla River

As Part of the Testimony of James G. Woodburn

Table I

Summary Monthly Mean Discharge in C. F. S. of Walla Walla River Near Confluence of North and South Forks

1918 to 1933

Year	Station at which records were obtained	June		July		August		September	
		Mean Cfs.	Variation from Mean for period	Mean Cfs.	Variation from Mean for period	Mean Cfs.	Variation from Mean for period	Mean Cfs.	Variation from Mean for period
1918	212	183	− 48	129	+ 17	121	+ 21	128	+ 17
1919	"	200	− 32	121	+ 9	109	+ 9	127	+ 16
1920	"	216	− 16	112	...	112	+ 12	118	+ 7
1921	"	236	+ 4	123	+ 11	110e	+ 10	123	+ 12
1922	"	400	+168	142	+ 30	132	+ 32	129	+ 18
1923	"	349	+118	124	+ 12	95.7	− 4	93.2	− 18
1924	"	121	−110	99.4	− 12	98.7	− 2	105	− 6
1925	"	158	− 74	100	− 12	98.7	− 2	105	− 6
1926	"	103	−128	80.6	− 31	83.4	− 17	105	− 6
1927	"	287	+ 56	106	− 6	88.7	− 12	150	+ 39
1928	"	161	− 70	110	− 2	92.9	− 7	a	
1930	215 & 216	185	− 46	81.5	− 30	82.2	− 18	81.9	− 29
1931	"	133	− 98	83.1	− 28	75.7	− 24	78.5	− 32
1932	"	300	+ 68	124	+ 12	96.4	− 4	100	− 11
1933	"	441	+210	138	+ 26	106	+ 4	108	− 3
Total		3,473		1,673.6		1,502.4		1,551.6	
Mean		231.5		111.6		100.2		110.8	
Acre-ft		13,770		6,860		6,150		6,810	

---

a Diversion for new Milton Power Plant apparently began in September, 1928.
e Estimated.

[fol. 343]

Table II

1933 Water Supply Conditions in Washington at 10-Day Intervals After Washington Rights Subsequent to 1892 of the Related Stream System Were Closed

Source of water	July 22 cfs.	Aug. 1 cfs.	Aug. 11 cfs.	Aug. 21 cfs.	Aug. 31 cfs.
Mill Creek below Blue Creek	34	33	36	36	35
Return from City Reservoir*	15	15	9	10	11
Sewage	5	5	5	5	5
Springs contributing to Related Stream System	16	16	15	15	15
Flow across State Line	22	18	18	17	18
	92	87	83	83	84
Less Gardena Diversion	34	32	28	21	28
Available Supply	58	55	55	62	56
Indicated gross duty 1 cfs. to:	94 acres	99 acres	99 acres	88 acres	97 acres

Average 1 cfs. to 95 acres.

Duty based on irrigation rights by decree:

Prior to 1893:	
Mill Creek	1,347.37 Acres
Garrison Creek	478.14 "
Yellowhawk Creek	647.97 "
East Little Walla Walla R.	459.04 "
West Little Walla Walla R.	546.90 "
Walla Wall River	1,506.11 "
Total	4,985.53 Acres
Subsequent to 1893:	
Mill Creek	472.93 Acres
Total	5,458.46 Acres

---

* This flow fluctuates greatly during the day, hence cannot be efficiently used for irrigation.

[fol. 344]

Table IIa

Measured Flow of Springs in the Walla Walla Area in Washington Which Contribute to Related Stream System

Spring Branch	Tributary To	Flow in Cfs. Aug. 13-16 1932	Flow in Cfs. Oct. 3 1933
Bryant Creek	Garrison	1.24	1.77
College-Boyer Creek	Mill	0.67	0.58
Coyle	Mill	0.13	0.50
Gordon-Maiden	W. L. W. W	2.62	2.98
Lasater	Yellowhawk	....	0.26
Lower Cold Creek	Mill	1.90	1.83
Shelton-Caldwell Creek	Yellowhawk	1.20	0.85
Stubblefield	Yellowhawk	0.69	0.83
Walsh Creek	W. L. W. W	1.06	1.61
Whitney	Yellowhawk	0.31	0.39
		9.82	11.60
Blue Mountain	W. W. R.		
Average of 3 measurements in July and Aug. 1932		1.53	
July 14, 1933		....	1.92

McEvoy W. W. R.		
Average of 3 measurements in July and Aug. 1932	2.67	....
July-August average, 1933	....	4.03
Total	14.02	17.55

[fol. 345]

Table III

1933 Water Supply Conditions on Part I of the Project in Oregon at 10-Day Intervals After Washington Rights Subsequent to 1892 on the Related Stream System Were Closed

Source of Water	July 22 cfs.	Aug. 1 cfs.	Aug. 11 cfs.	Aug. 21 cfs.	Aug. 31 cfs.
South Fork Sta. 214	118	113	110	108	112
North Fork Sta. 216	5	5	4	3	3
Consumptive use on North Fork above Sta. 216 (Estimated)	5	5	5	5	5
Available Water	128	123	119	116	120
Indicated gross duty. 1 cfs. to:	25 acres	26 acres	26 acres	27 acres	26 acres

Average 1 cfs. to 26 acres

Duty based on irrigation rights by decree (through 1909) except Hudson Bay Co. and Couse Creek: Total 3,140.051 acres.

Source of Data in Table

South Fork Sta. 214: Data page 55.
North Fork Sta. 216: Data page 63.

Consumptive use on North Fork above Sta. 216: There are 193.6 acres on the North Fork above Sta. 216, which have water rights by decree. The decreed maximum rate of diversion is 7.28 cfs. The measured rate of all diversions on July 26, 1932 was 9.5 cfs., and on Aug. 25, 1933, was 10.0 cfs. There is, however, some gain by springs and seepage, part of which may be return flow from irrigation, so the consumptive use is estimated as about half of the amount diverted, or 5 cfs.

[fol. 346]

Table IV

Measured Oregon Diversions Above Center of Sections 26, 27, and 34, 1933

No.	Name	Total Acres Served, by decree	Maximum allowable diversion by decree CFS	July		August	
				Diversion Mean CFS	Over Diversion Mean CFS	Diversion Mean CFS	Over Diversion Mean CFS
	South Fork						
17	Poulsen	8.80	0.33	2.36	2.03	2.03	1.70
18	Hopkins	118.27	4.44	6.77	4.51	4.75	2.23
19	Rhuberg-Powell			2.01		1.74	
20	Gray-Demaris			0.17		0.18	
22	Dorothy	87.40	3.28	1.75	None	2.23	None
	North Fork						
37	Bowlus	57.60	2.16	3.09	0.93	2.31	0.15
	Walla Walla River						
24	Demaris	81.10	3.04	4.29	1.25	3.18	0.14
40	Spence	123.18	4.62	4.67	0.05	4.10	None
42	Zell	81.52	3.07	4.55	1.48	3.57	0.50
	Totals above Milton	557.87	20.94	29.66	10.25	24.09	4.72

57 Milton	330.92	13.23	15.38	2.15	15.35	2.12
Tum-a-lum	37.17	1.40	2.6	1.20	1.94	0.54
East Side	260.22	11.03	13.19	2.16	12.50	1.47
Little Walla Walla River						
Stillman	79.75	3.19	5.06	1.87	4.83	1.64
Perkins	43.276	2.49	3.0	0.51	2.88	0.39
E. Crockett	222.98	8.36	10.71	2.35	10.77	2.41
W. Crockett	334.91	12.59	14.13	1.54	13.86	1.27
Ford	503.02	18.88	20.42	1.54	18.45	None
Powell-P. V.	217.15	8.17	9.8	1.63	8.4	0.23
Totals from Milton	2,029.396	79.34	94.29	14.95	88.98	10.07
Totals	2,587.266	100.28	123.95	25.20	113.07	14.79

[fol. 347]

Table IVa

Measured Diversions on Part 2 of the Project in Oregon

Name	Acres	Maximum allowable diversion CFS	Part of July		August	
			Diversion Mean CFS	Over Diversion Mean CFS	Diversion Mean CFS	Over Diversion Mean CFS
A. Including all rights prior to 1909						
Wells ditch	167.18	6.27	6.96	0.69	5.78	....
West Prong[1]	375.74	7.85	6.91	....	4.66	....
Totals	542.92	14.12	13.87	....	10.44	....
B. Including all rights prior to 1893.						
Wells ditch	163.18	6.12	6.96	0.84	5.78	....
West Prong[1]	117.29	2.81	6.91	4.10	4.66	1.85
Totals	280.47	8.93	13.87	4.94	10.44	1.85

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[1] Between SW¼ NE¼ Section 22 and State Line.

[fol. 348]

Table V

1933 Water Supply Conditions on Part 2 of the Project in Oregon at 10-Day Intervals After Washington Rights Subsequent to 1892 on the Related Stream System Were Closed

Source of Water	July 22 cfs.	Aug. 1 cfs.	Aug. 11 cfs.	Aug. 21 cfs.	Aug. 31 cfs.
Big Spring Branch at Crigler's	10	9	8	8	8
Ballou Spring Branch in NW/NE Sect. 23 plus diversion therefrom in NW/SE Sect. 23	5	5	5	5	5
East Prong Spring Branch at Wells intake	8	7	6	7	7
West Prong Spring Branch at SW/NE Sect. 22.	10	8	8	6	6
	33	29	27	26	26
Less State Line Flow	15	13	12	12	13
Water Used	18	16	15	14	13
Indicated gross duty 1 cfs. to:	63 acres	71 acres	65 acres	82 acres	88 acres

Duty based on irrigation rights through 1909 between points of measurement and state line:

By decreee:		
Big Spring Branch	121.55	acres
L. W. W. (Ballou) Spring Branch	189.30	"
East Prong (Welis Ditch)	169.18	"
West Prong	375.74	"
Total by decree	855.77	"
By permits:		
Big Spring Br. (Grandview)	288.00	"
Total	1,143.77	acres

Source of Data in Table

Big Spring at Criglers: Data page 153.
Ballou Spring Branch: Data pages 150 and 151.
East Prong: Data pages 157 and 165.
West Prong: Data page 158.
State Line: Data pages 77–101.

[fol. 349]

Table VI

Summary

Amount and Distribution of Surplus Created by Closing Oregon Rights Subsequent to 1892

1933

	July 22	Aug. 1	Aug. 11	Aug. 21	Aug. 31
1 Oregon rate of use:					
Maximum by decree					
Available surplus in cfs..........	44	38	34	31	35
Gardena shortage...............	22	24	28	35	28
Remainder for distribution......	22	14	6	.....	7
Acres subsequent to 1892 which can be irrigated:					
Washington...............	614	383	54	.....	71
Oregon...................	485	309	143	.....	166
Total..................	1,099	692	197	.....	237
Resulting increase in flow across State Line—cfs..............	28	28	29	31	29
2. Oregon rate of use:					
1¼ miners in. per acre.					
Available surplus in cfs..........	59	52	47	44	48
Gardena shortage in cfs.........	22	24	28	35	28
Remainder for distribution......	37	28	19	9	20
Acres subsequent to 1892 which can be irrigated:					
Washington...............	1,179	1,017	601	223	628
Oregon...................	950	661	473	236	499
Total..................	2,129	1,678	1,074	459	1,127
Resulting increase in flow across State Line—cfs..............	34	34	34	37	34
3. Oregon rate of use:					
1 miners in. per acre.					
Available surplus in cfs..........	73	66	61	57	60
Gardena shortage in cfs.........	22	24	28	35	28
Remainder for distribution......	51	42	33	22	32
Acres subsequent to 1892 which can be irrigated:					
Washington...............	1,385	1,361	1,182	816	1,167
Oregon...................	1,330+	1,261	957	599	921
Total..................	2,715+	2,622	2,139	1,415	2,088
Resulting increase in flow across State Line—cfs..............	36	38	40	43	40
Combined flow at Stations 214 and 216.....................	123	118	114	111	115
Flow of Mill Cr. below Blue Cr...	34	33	36	36	35

[fol. 350]

Table VIa

Amount and Distribution of Surplus Created by Closing Oregon Rights Subsequent to 1892

1932

	July 22	Aug. 1	Aug. 11	Aug. 21	Aug. 31
1. Oregon rate of use:					
Maximum by decree					
Available surplus in cfs.	37	34	25	17	22
Gardena shortage	19	28	43	35	36
Remainder for distribution	18	6	.....	.....	.....
Acres subsequent to 1892 which can be irrigated:					
Washington	515	54	.....	.....	.....
Oregon	395	144	.....	.....	.....
Total	910	198	.....	.....	.....
Resulting increase in flow across State Line	24	29	25	17	22
2. Oregon rate of use:					
1¼ miners in. per acre.					
Available surplus in cfs.	52	49	39	30	35
Gardena shortage	19	28	43	35	36
Remainder for distribution	33	21	.....	.....	.....
Acres subsequent to 1892 which can be irrigated:					
Washington	1,127	656	.....	.....	.....
Oregon	831	524	.....	.....	.....
Total	1,958	1,180	.....	.....	.....
Resulting increase in flow across State Line	30	35	39	30	35
3. Oregon rate of use:					
1 miners in. per acre.					
Available surplus in cfs.	66	63	53	43	49
Gardena shortage	19	28	43	35	36
Remainder for distribution	47	35	10	8	13
Acres subsequent to 1892 which can be irrigated:					
Washington	1,385	1,226	338	234	481
Oregon	1,330+	1,023	288	241	363
Total	2,715+	2,249	626	475	844
Resulting increase in flow across State Line	33	40	46	37	41
Combined flow at Stations 214 and 216	117	114	105	97	102
Mill Creek below Blue Creek	36	34	30	30	29

[fol. 351]

Table VIb

Amount and Distribution of Surplus Created by Closing Oregon Rights Subsequent to 1892

1931

	July 1	July 15	Aug. 1	Aug. 15	Aug. 31
1. Oregon rate of use:					
Maximum by decree					
Available surplus in cfs.	19	11	3	5	3
Gardena shortage	6	31	51	51	51
Remainder for distribution	13	.....	.....	.....	.....
Acres subsequent to 1892 which can be irrigated:					
Washington	338	.....	.....	.....	.....
Oregon	288	.....	.....	.....	.....
Total	626	.....	.....	.....	.....
Resulting increase in flow across State Line	9	11	3	5	3
2. Oregon rate of use:					
1¼ miners in. per acre.					
Available surplus in cfs.	32	24	16	18	16
Gardena shortage	6	31	51	51	51
Remainder for distribution	22	.....	.....	.....	.....
Acres subsequent to 1892 which can be irrigated:					
Washington	907	.....	.....	.....	.....
Oregon	609	.....	.....	.....	.....
Total	1,516	.....	.....	.....	.....
Resulting increase in flow across State Line	15	24	16	18	16
3. Oregon rate of use:					
1 miners in. per acre.					
Available surplus in cfs.	43	35	27	29	27
Gardena shortage	6	31	51	51	51
Remainder for distribution	37	4	.....	.....	.....
Acres subsequent to 1892 which can be irrigated:					
Washington	1,277	52	.....	.....	.....
Oregon	1,086	139	.....	.....	.....
Total	2,363	191	.....	.....	.....
Resulting increase in flow across State Line	19	32	27	29	27
Combined flow at Stations 214 and 216	99	91	83	85	83

[fol. 352]

Table VII

Gain in Flow of the Walla Walla River in Washington

1933—State Line to Kennedy Bridge

		July Mean cfs.	August Mean cfs.
River at State Line		9.4	5.4
Plus tributaries:	Yellowhawk	17.1	14.4
	East Little W. W. R.	11.1	4.6
	McEvoy Spring Branch	4.8	3.3
		42.4	27.7
Minus diversion:	Gardena	47.1	22.8
		− 4.7	+ 4.9
River below Gardena diversion		3.2	10.3
Gain		7.9	5.4

1932—State Line to Kennedy Bridge

	June 22–23 Mean of two measurements	July 16[1]	July 29	Aug. 21	Sept. 11
River at State Line	19.0	7.6	5.8	5.5	4.2
Plus tributaries:					
Yellowhawk	32.2	25.0	11.3	8.1	4.9
East L. W. W. R.	21.2	8.8	7.6	5.0	6.7
McEvoy Spring Br	3.2	3.5	3.0	1.5	0.9
	75.6	44.9	27.7	20.1	16.7
Minus diversion:					
Gardena	83.1	50.5	22.7	15.7	....
	− 7.5	− 5.6	+ 5.0	+ 4.4	+16.7
River below Kennedy Br.	0.7	4.0	10.1	9.7	26.2
Gain	8.2	9.6	5.1	5.3	9.5

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[1] Rain on July 15th doubtless incraesed the gain measured on the 16th.

[fol. 353]

Table VII (Continued)

Seepage Gain in Flow of the Walla Walla River in Washington

1932—Kennedy Bridge to Mouth of Pine Creek

	June 25–26 Mean of two measurements	July 16[1]	July 29	Aug. 21	Sept. 11
River below Kennedy Br.	4.0	4.0	10.1	9.7	26.2
Plus tributaries:					
Blue Mt. Spring Br	2.2	1.5	1.8	1.3	1.1
West Little W. W. R.	2.2	5.1	4.4	1.0	0.3
Mill Creek	2.4	2.8	2.4	0.7	0.3
Dry Creek	0.8	1.3	0.6	0.3	0.3
Cross-over from Mud Cr.	1.7	0.4	0.1	0.1	0.2
Mud Creek	0.8	1.2	0.5	0.2	3.3
Total tributaries	10.1	12.3	9.8	3.6	5.5
Sum	14.1	16.3	19.9	13.3	31.7
Minus diversions:					
Smith-Harer	2.0	1.3	1.0	1.6	2.1
Dicus	0.2	0.3	0.1	0.1	....
Bergevin-Williams	3.8	3.5	4.3	4.5	4.7
Mud Creek (Lowden) No. 2	3.9	4.6	3.6	....	6.9
Garden City (Sinkler)	0.5	2.3	1.0	1.9	6.0
Rader	5.7	4.9	7.3	3.7	....
Touchet Irr. & Imp. Co.	6.0	4.5	4.1	2.8	5.5
Total diversions	22.1	21.4	21.4	14.6	25.2
Difference	− 8.0	− 5.1	− 1.5	− 1.3	+ 6.5
River above Pine Creek	2.4	1.9	1.0	0.5	2.6
Gain	10.4	7.0	2.5	1.8	3.9
Total gain in flow between State Line and mouth of Pine Creek	18.6	16.6	7.6	7.1	13.4

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[1] Rain on July 15 doubtless increased the gain measured on the 16th.

[fol. 354] OREGON EXHIBIT No. 32

At a regular meeting of the Board of Control of the State of Oregon, commenced and held at the office of the Board of Control, in the Capitol Building, in the City of Salem, Oregon, on Wednesday, the 12th day of April, 1911, at the hour of one o'clock P. M., those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent Water Division No. 1.
Geo. T. Cochran, Superintendent Water Division No. 2.

* * * * * * *

On motion of Geo. T. Cochran the following persons were appointed to act as Water Masters:

Willard Bradley, of Freewater, for Umatilla County.
James Sills, of Cove, for Union County. * * *

At a special meeting of the Board of Control of the State of Oregon, commenced and held at the office of the Board of Control, in the Capitol Building, in the City of Salem, Oregon, on Monday, the 19th day of June, 1911, at the hour of nine o'clock A. M., those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent of Water Division No. 1.
George T. Cochran, Superintendent of Water Division No. 2.

* * * * * * *

Mr. Willard Bradley of Freewater tendered to George T. Cochran, Superintendent of Water Division No. 2, his resignation as water master for Umatilla County. This resignation was accepted and Mr. L. D. Howland was appointed to take his place. This appointment to be effective July 5th, 1911. * * *

[fol. 355] At the regular, semi-annual meeting of the Board of Control, commenced on the 9th day of April, 1913, at the hour of 10:00 A. M., and held in the office of the Board of Control, in the Capitol Building, in the City of Salem, Oregon, those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent of Water Division No. 1.

Whereupon, on motion, the meeting adjourned until the 24th day of April, 1913.

At an adjourned meeting of the Board of Control, held in the office of said Board, in the Capitol Building, in the City of Salem, Oregon, on the 24th day of April, 1913, at the hour of 10:00 o'clock A. M. of said day those present were:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent of Water Division No. 1.
Geo. T. Cochran, Superintendent of Water Division No. 2.

Whereupon the following proceedings were had, to-wit:

* * * * * * *

On motion of Mr. Geo. T. Cochran, the following persons were appointed to act as Water Masters:

William Gardner, for Baker and Union Counties.
L. A. Reineman, for Umatilla and Morrow Counties.
Warren W. Roeder, for Malheur County, to succeed Mr. Ivan E. Oakes, whose resignation was submitted and accepted at this time. * * *

[fol. 356] Salem, Oregon, April 10, 1918.

A regular meeting of the State Water Board was held this day in the office of the President of the Board at 10:30 A. M.

Present:

John H. Lewis, State Engineer, President.
James T. Chinnock, Superintendent Water Division No. 1.
Geo. T. Cochran, Superintendent Water Division No. 2.

Whereupon the following proceedings were had, to-wit:

* * * * * * *

Upon the recommendation of the Superintendent of Water Division No. 2, Mr. Geo. Gombert of Vale, Oregon, was appointed as water master for Malheur County, and Mr. Aubrey E. Perry of Pendleton, Oregon, was appointed as water master for Umatilla and Morrow Counties.

[fol. 357] State of Oregon

Water District No. 5

Certificate of Appointment of Water Master

This is to certify, that J. F. Spencer of Umatilla County, Oregon, of Water District No. 5, within the Counties of Umatilla, Morrow, and Gilliam, Oregon, is hereby appointed water master of said Water District, to hold said office and fulfill and perform all the duties thereof, according to law, until his successor shall have been appointed and shall have qualified.

Witness my hand this 2nd day of January, 1929.

Rhea Luper, State Engineer.

[fol. 358] STATE OF OREGON,
County of Marion, ss:

I, Chas. E. Stricklin, State Engineer of the State of Oregon hereby certify that the foregoing copies of the excerpts of the minutes of the Board of Control and State Water Board covering the meetings of said boards pertaining to the appointments of water masters for Umatilla County, Oregon and the foregoing certificate of appointment have been compared with the original minutes and certificate of appointment as the same appear of record and on file in this office and in my custody, and are true and correct copies thereof.

Dated this 21st day of March, 1934.

Chas. E. Stricklin, State Engineer.

[fol. 359]

OREGON EXHIBIT No. 39

Gardena Tracts

Irrigated Lands Above the Elevation of The Old Walla Walla Canal

T. 6 N. R. 33 E. W. M.		
Section 4		
SE¼ of SE¼	40	
SW¼ of NE¼	19.2	
NE¼ of SW¼	18.4	
SE¼ of SW¼	38.4	
SW¼ of SW¼	2.2	
SW¼ of SE¼	40.	
NW¼ of SE¼	40.	
NE¼ of SE¼	30.8	
SE¼ of NE¼	0.4	229.4
Section 9		
NE¼ of NE¼	40.	
NW¼ of NE¼	37.3	
SW¼ of NE¼	7.9	
SE¼ of NE¼	26.4	
NE¼ of NW¼	28.7	
NW¼ of NW¼	5.8	146.1
Section 10		
NE¼ of NE¼	23.2	
NW¼ of NE¼	40.	
SW¼ of NE¼	40.	
SE¼ of NE¼	40.	
NE¼ of NW¼	40.	
NW¼ of NW¼	40.	
SW¼ of NW¼	33.3	
SE¼ of NW¼	40.	
NW¼ of SW¼	5	
NE¼ of SW¼	25.2	
NW¼ of SE¼	34.	
NE¼ of SE¼	38.6	
SE¼ of SE¼	13.8	
SW¼ of SE¼	2.2	415.3
T. 6 N. R. 34 E. W. M.		
Section 7		
NW¼ of SW¼	8.8	
SW¼ of SW¼	20.8	29.6
Section 12		
SW¼ of NW¼	10.4	
NW¼ of SW¼	4.8	15.0
T. 6 N. R. 33 E. W. M.		
NW¼ of NW¼	16.4	
NE¼ of NW¼	15.2	
SW¼ of NW¼	40	
SE¼ of NW¼	29.6	
NE¼ of SW¼	40.	
NW¼ of SW¼	37.8	
SW¼ of SW¼	6.1	
SE¼ of SW¼	30.3	
NW¼ of SE¼	40.	
NE¼ of SE¼	18.8	
SW¼ of SE¼	27.	
SE¼ of SE¼	32.	
SW¼ of NE¼	10.4	
SE¼ of NE¼	7.6	351.2
Section 12		
NE¼ of SE¼	21.	
NW¼ of SE¼	23.6	
SW¼ of SE¼	40.	
SE¼ of SE¼	40.	127.6
Section 13		
NE¼ of NE¼	18.	
NW¼ of NE¼	59.	
NE¼ of NW¼	62.3	
NW¼ of NW¼	62.8	
Lot 1	35	
Lot 2	31	
Lot 3	38	
Lot 4	11.3	317.4
Section 14		
NE¼ of NE¼	34.	
NW¼ of NE¼	10.	44.
Total	1675.6 Acres	

[fol. 360]

OREGON EXHIBIT No. 42

[Title omitted]

Hydrographic Data and Measurements Submitted With the Testimony of Ed K. Humphrey

[fol. 361]

Summary of 1933 Use Data

Test Places

User	Soil Class	Acres Irrigated	Ac. ft. used per 30 day Mo.	Mean daily use Assuming Continuous Flow	
				Sec. Ft.	Min. In
Babcock, D.	1 & 3	10.0	2.87	.0482	1.93
Bookout, W. R.	1 & 2	15.0	1.83	.0304	1.22
Eiffert, C.	1 & 3	16.7	3.31	.0556	2.25
Harris, C.	1 & 2A	13	2.27	.0380	1.52
Hermann, W.	2A & 3	19.0	1.93	.0325	1.30
Herr, C.	3	8.0	2.57	.0432	1.73
Karker, C.	3	5.9	2.62	.0440	1.76
Knopf, Geo.	1 & 3	3	2.87	.0482	1.93
Roeder, W. W.	3	19.3	2.69	.0452	1.81

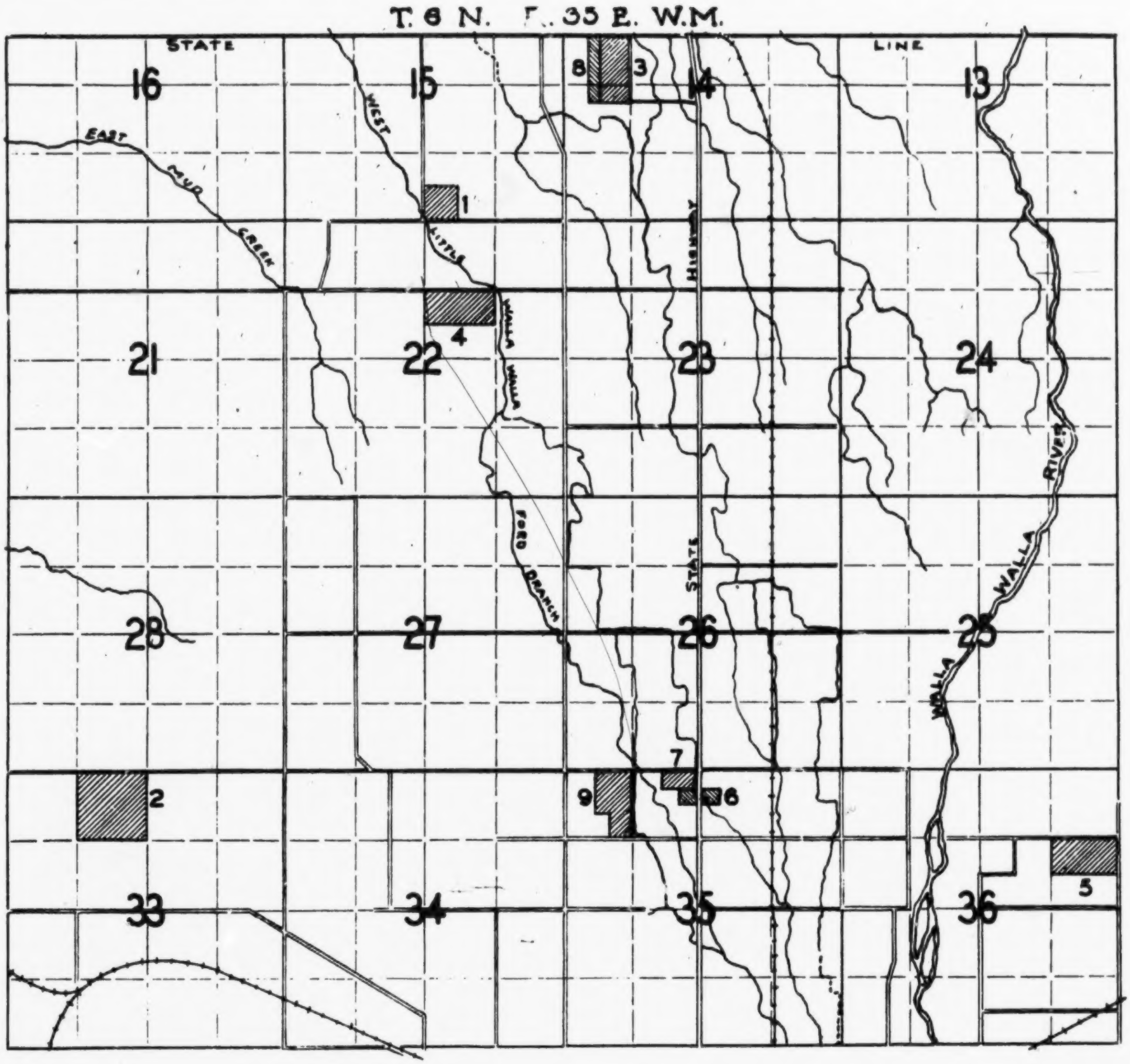
Location of Test Places

Babcock	SW¼	SE¼	Sec. 15 T 6N. R. 35E
Bookout	NE¼	NW¼	Sec. 33 T 6N. R. 35E
Eiffert	SW¼	NW¼	Sec. 14 T 6N. R. 35E
Harris	SW¼	NE¼	Sec. 22 T 6N. R. 35E
Hermann	SE¼	NE¼	Sec. 36 T 6N. R. 35E
Herr	NW¼ NE¼	NE¼ NW¼	Sec. 35 T 6N. R. 35E Sec. 35 T 6N. R. 35E
Karker	NE¼	NW¼	Sec. 35 T 6N. R. 35E
Knopf	SW¼	NW¼	Sec. 14 T 6N. R. 35E
Roeder	NW¼	NW¼	Sec. 35 T 6N. R. 35E

(Here follows 1 photo folio 362.)

MAP SHOWING LOCATION OF
TEST PLACES

1 – D. H. BABCOCK
2 – W.R. BOOKOUT
3 – CHAS. EIFFERT
4 – C. B. HARRIS
5 – WALTER HERMANN
6 – C. E. HERR
7 – C. J. KARKER
8 – GEO. KNOPF
9 – W.W. ROEDER


T. 6 N. R. 35 E. W.M.
STATE
LINE
16
15
14
13
21
22
23
24
28
27
26
25
33
34
35
36
1
2
3
4
5
6
7
8
9
EAST MUD CREEK
WEST LITTLE WALLA WALLA
FORD BRANCH
STATE HIGHWAY
WALLA WALLA RIVER

[fol. 363]

Eifferrt Place (16.7 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 3–30........	28	1.188	.0711	1.188	.0711	66.0	3.95	....	....
July............	31	1.038	.0622	1.038	.0622	63.8	3.82	....	....
Aug.............	31	.744	.0445	.744	.0445	45.7	2.74	....	....
Sep. 1–20........	20	.686	.0411	.686	.0411	27.2	1.63	....	....
Total.....	110	.....	.....	.....	.....	202.7	12.14	.110	3.31

Herr Place (8.0 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 12–30.......	19	.428	.0535	.428	.0535	16.1	2.01	....	(Derived
July............	31	.302	.0377	.302	.0377	18.6	2.32	....	from Col.8
August..........	31	.289	.0361	.289	.0361	17.8	2.22	....	....
Sep. 1–23........	23	.411	.0514	.411	.0514	18.8	2.35	....	....
Totals.........	104	.....	.....	.....	.....	71.3	8.90	.0856	2.57

[fol. 364]

Bookout Place (15.0 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 1–30........	30	.475	.0317	.475	.0317	28.3	1.89	....	....
Jul 1–4..........	4	.31	.0207	.31	.0207	2.46	.16	....	....
Totals.........	34	.....	.....	.....	.....	30.76	2.05	.061	1.83

[fol. 365]

Hermann Place (19.0 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 3–30........	21	.702	.037	.527	.0273	29.3	1.54	....	....
July............	31	.585	.0308	.585	.0308	36.0	1.89	....	....
August..........	31	.583	.0307	.583	.0307	35.8	1.88	....	....
September.......	21	.626	.0330	.626	.0330	26.1	1.37	....	....
Totals.........	104	.....	.....	.....	.....	127.2	6.68	.0642	1.93

Harris Place (13 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 7–30	22	.569	.0438	.522	.0321	24.8	1.91	....	....
July	29	.544	.0418	.509	.0392	31.3	2.41	....	....
August	21	.385	.0296	.261	.0200	16.0	1.23	....	....
September	16	.450	.0346	.240	.0185	14.3	1.10	....	....
Totals	88	.....	.....	.....	.....	86.4	6.65	.0756	2.27

[fol. 366]

Roeder Place (19.3 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 5–30	25	1.30	.0673	1.25	.0648	64.4	3.34	....	....
July	31	.662	.0343	.661	.0343	40.8	2.11	....	....
August	31	.732	.0379	.732	.0379	45.0	2.33	....	....
Sep. 1–11	11	.890	.0461	.890	.0461	19.4	1.01	....	....
Totals	98	.....	.....	.....	.....	169.6	8.79	.0897	2.69

[fol. 367]

Karker Place (5.9 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used	Per A	Assuming continuous flow	Per A		Per Mo.	Per Day	Per Mo. of 30 days
Jun. 3–30	28	.367	.0622	.367	.0622	20.4	3.46	....	....
July	31	.197	.0334	.197	.0334	12.1	2.05	....	....
August	31	.224	.0380	.224	.0380	13.8	2.34	....	....
Sep. 1–9	9	.267	.0453	.267	.0453	4.76	.81	....	....
Totals	99	.....	.....	.....	.....	51.1	8.66	.0875	2.62

Knopf Place (3 acres irrigated)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used	Per A	Assuming continuous flow	Per A		Per Mo.	Per Day	Per Mo. of 30 days
June 26–30	5	.139	.0463	.139	.0463	1.38	.46	....	....
July	31	.154	.0513	.154	.0513	9.47	3.16	....	....
August	31	.136	.0453	.136	.0453	8.36	2.79	....	....
Sept. 1–24	24	.144	.0480	.144	.0480	6.86	2.29	....	....
Totals	91	.....	.....	.....	.....	26.07	8.70	.0956	2.87

[fol. 368] **Table Showing Per Acre Delivery Amounts Based on the Preceding Figures and the Flow in the Gardena Canal.**

1933

Month	Diverted from River into Gardena Canal		Ac. Ft. per acre diverted	Ac. Ft. per acre diverted to project	Continuous flow per acre available if applied uniformly to 5,251 acres			
					Diverted from River		Delivered to Project	
	Mean daily discharge in second-feet	Total acre-feet			Sec. Ft.	Min. In.	Sec. Ft.	Min In.
Mar. (6–31)	72.6	3,740	.71	.62	.0138	.552	.0121	.484
April	100	5,950	1.13	.99	.0190	.760	.0166	.664
May	104	6,400	1.22	1.07	.0198	.792	.0173	.692
June	98.1	5,840	1.11	.97	.0187	.748	.0163	.652
July	47.1	2,900	.55	.48	.0090	.360	.0079	.316
August	22.8	1,400	.27	.24	.0043	.172	.0038	.152

Note:—Transportation loss between river and project assumed to be 12.7%.

(49b)

Babcock Place (10.0 acres)

Water Used During Period of Test

Month	Number of days used	Mean Daily Discharge in S. F.				Total ac. ft. used	Total Acre-feet per Ac. used		
		For number of days used		Assuming continuous flow			Per Mo.	Per Day	Per Mo. of 30 days
			Per A		Per A				
Jun. 3–30	28	.633	.0633	.633	.0633	35.2	3.52	....	....
July	27	.443	.0443	.385	.0385	23.7	2.37	....	....
Aug.	17	.352	.0352	.193	.0193	11.9	1.19	....	....
Sep. 1–9	5	.296	.0296	.164	.0164	2.93	.29	....	....
Totals	77	.....	.....	.....	.....	73.73	7.37	.0957	2.87

(75b)

[fol. 369]

1932

Use of Water from Wells

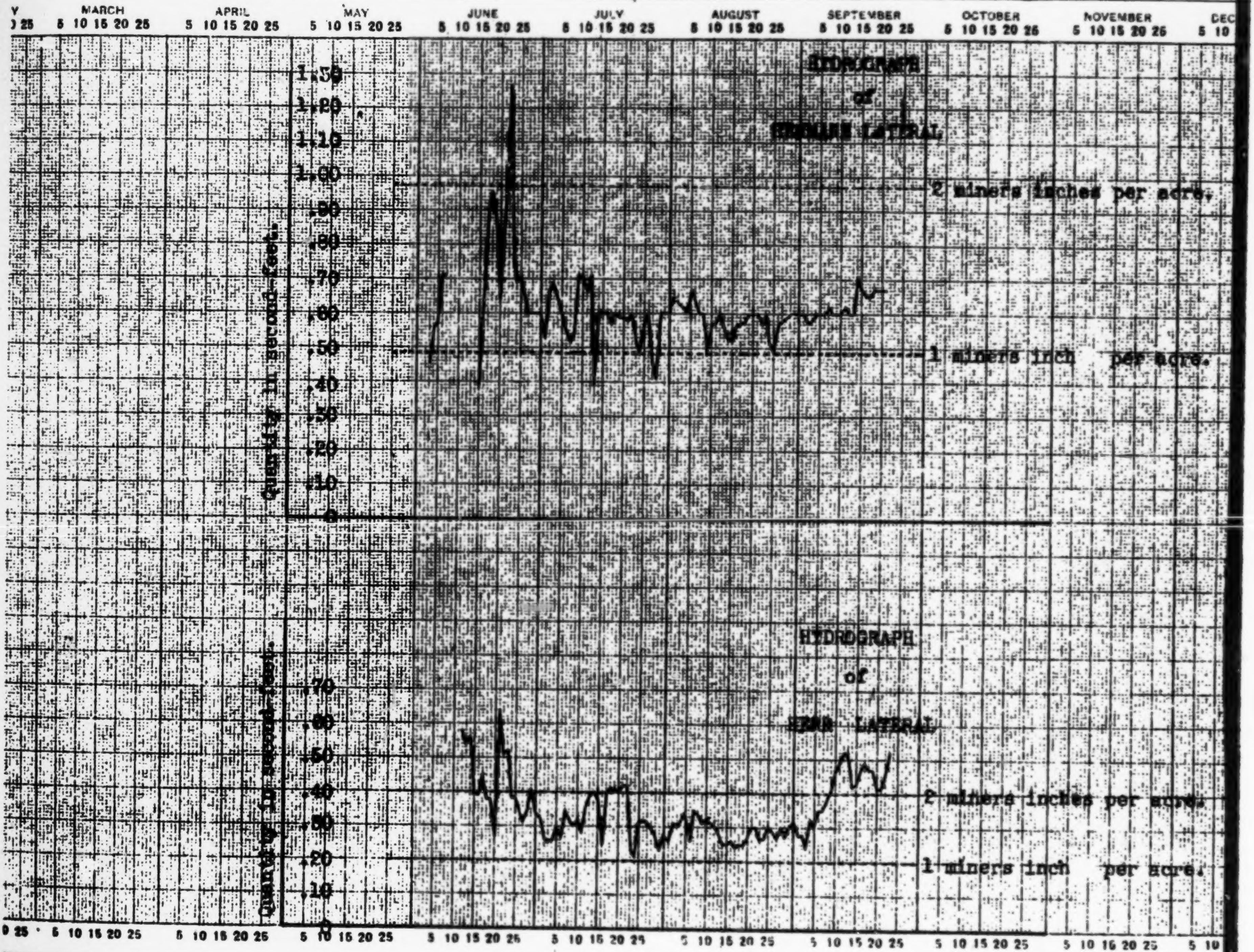
Owner	Acres irrigated	May KWH	May Ac. Ft. Ac.	June KWH	June Ac. Ft. Ac.	July KWH	July Ac. Ft. Ac.	August KWH	August Ac. Ft. Ac.	Sept. KWH	Sept. Ac. Ft. Ac.	Total Power Bill	Total Ac. Ft. Ac.
Breithaupt, C.	9.5	374	.37	1,996	1.95	2,541	2.48	1,801	1.76	761	.74	101.07	7.30
Buroker, M. A.	12	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
Carteer, M.	2.6	2	....	174	.60	410	1.42	324	1.12	.....	....	59.00	3.14
Delahe, Mrs.	9.8	.....	....	90	.11	1,947	2.38	1,657	2.03	689	.84	64.60	5.36
Dougherty, W. A.	10.	.....	....	7.26	.77	1,601	1.71	962	1.03	238	.25	104.76	3.76
Gent, W. A.	19.7	210	.25	8	....	996	1.19	1,083	1.29	75	.09	52.49	2.82
Henry, O. Est.	10.	.....	....	.....	....	1,718	1.99	1,805	2.09	1,076	1.24	61.50	5.32
Lefor, Ed.	9.8	1,637	1.93	1,422	1.66	2,398	2.80	2,172	2.53	599	.70	136.77	9.60
Miller, Andy	8.0	10	....	5	....	985	1.26	1,123	1.44	271	.35	53.63	3.05
Morris, W. H.	4.4	.....	....	.....	....	798	1.44	748	1.34	269	.48	40.39	3.26
Pescillo, Joe	19.8	.....	....	79	.034	2,648	1.14	2,322	1.00	2,283	.98	106.90	3.15
Reese, Alpha	9.5	.....	....	429	.43	2,835	2.82	2,127	2.12	1,185	1.18	108.80	6.55
Redfern, A.	19.8	.....	....	.....	....	2,592	1.58	2,192	1.34	1,663	1.02	93.35	3.94
Samuel, Roy	9.8	54	.053	274	.27	1,233	1.21	1,556	1.53	815	.80	94.93	3.86

Pumping Equipment Efficiency Data

Owner	Forty	Location Sec.	Tp.	Rg.	Date of test 1933	Acres irrigated	Static head	Friction head	Discharge in Sec. ft.	Energy input in KW.	Efficiency percent
Breithaupt, Chas......	SE¼NE¼	34	6N.	35E	Aug. 8	9.5	28.95	3.93	.359	3.19	31.3
Buroker, M. A........	SW¼SE¼	27	6N.	35E	Aug. 7	12.0	50.43	.55	.421	4.95	36.8
Carter, M............	SE¼SE¼	34	6N.	35E	Jul. 22	2.6	17.30	.42	.160	1.66	16.3
Delahe, Mrs..........	SE¼NW¼	34	6N.	35E	Aug. 8	9.8	38.2	1.00	.371	2.56	48.1
Dougherty, W. A......	NW¼SE¼	34	6N.	35E	Aug. 8	10.	44.98	8.20	.553	4.29	58.1
#1 Farmer's Bro. Co...	NW¼SW¼	33	6N.	35E	Jul. 22	....	31.37	4.82	.446	2.87	44.6
#2 " " "..	NW¼SW¼	33	6N.	35E	Jul. 22	....	35.00	7.96	1.080	10.13	38.7
Gent, W. A..........	SE¼SW¼	35	6N.	35E	Aug. 7	19.7	21.35	.14	.727	2.70	51.9
Henry, O., Est........	SE¼SW¼	34	6N.	35E	Aug. 11	10.	42.85	1.58	.446	3.19	52.6
Irons, John..........	NE¼NW¼	3	5N.	35E	Jul. 22	7.8	23.70	4.14	.421	2.97	33.4
Kirkwood, R. W......	NW¼SE¼	34	6N.	35E	Aug. 8	10.	42.40	2.64	.279	1.77	60.3
Lefor, Ed............	SE¼NW¼	34	6N.	35E	Aug. 8	9.8	43.53	2.85	.581	4.21	54.4
Miller, Andy.........	NW¼SW¼	34	6N.	35E	Aug. 11	8.0	42.36	3.30	.312	2.52	47.9
Morris, W. H.........	SE¼NW¼	34	6N.	35E	Aug. 8	4.4	46.53	2.61	.267	2.83	39.8
Pescillo, Joe..........	SE¼NW¼	33	6N.	35E	Aug. 9	19.8	48.55	5.80	.347	3.36	47.6
Reese, Alpha..........	NE¼SW¼	34	6N.	35E	Aug. 7	9.5	55.52	6.66	.404	3.53	60.3
Redfern, Arthur......	SE¼NW¼	33	6N.	35E	Aug. 9	19.8	42.65	7.81	.499	3.41	62.6
Samuel, Roy.........	SW¼NE¼	34	6N.	35E	Aug. 8	9.8	43.45	4.00	.347	2.99	46.6
Kirkwood, R. K......	NW¼SE¼	34	6N.	35E	Aug. 8	9.6	33.03	3.21	.324	2.17	51.2
	Mean......................................						38.85	3.77	.44	3.44	46.4

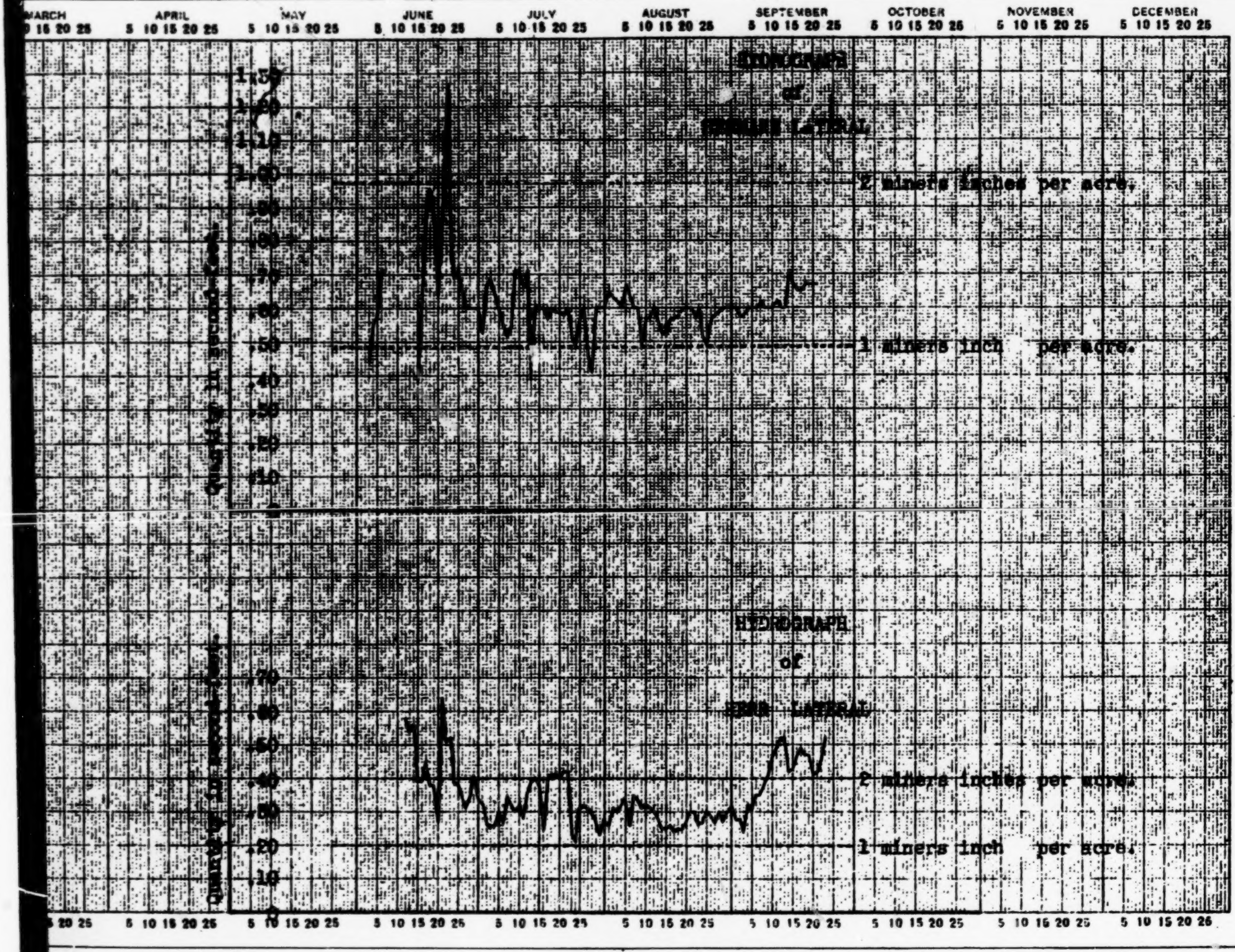
(Here follow 3 photos, folios 371–373)

1933



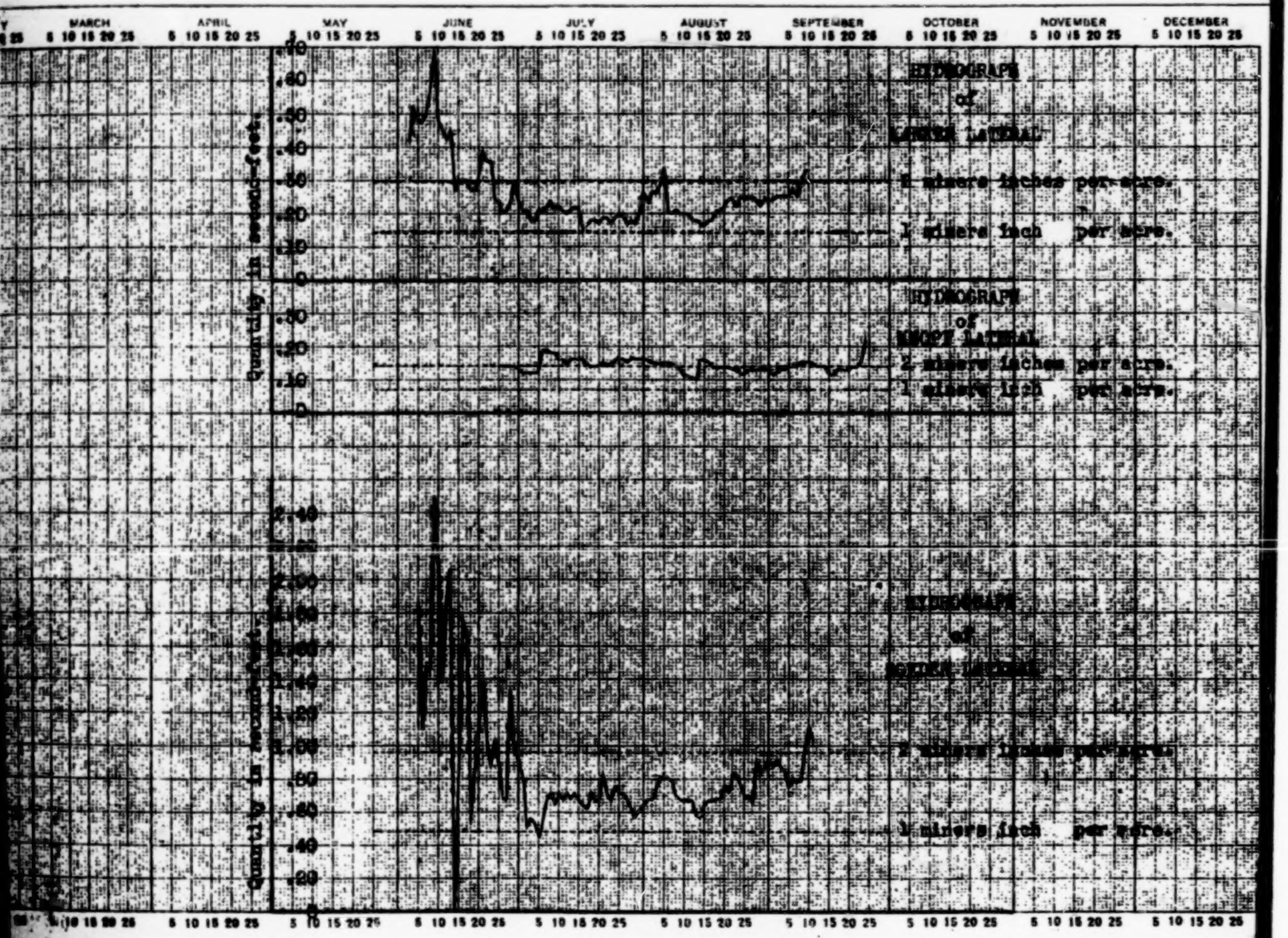
KEUFFEL & ESSER CO., NE

1933



KEUFFEL & ESSER CO., NEW YORK, NO. 348

1933



KEUFFEL & ESSER CO., NEW YORK.

OREGON EXHIBIT NO. 43

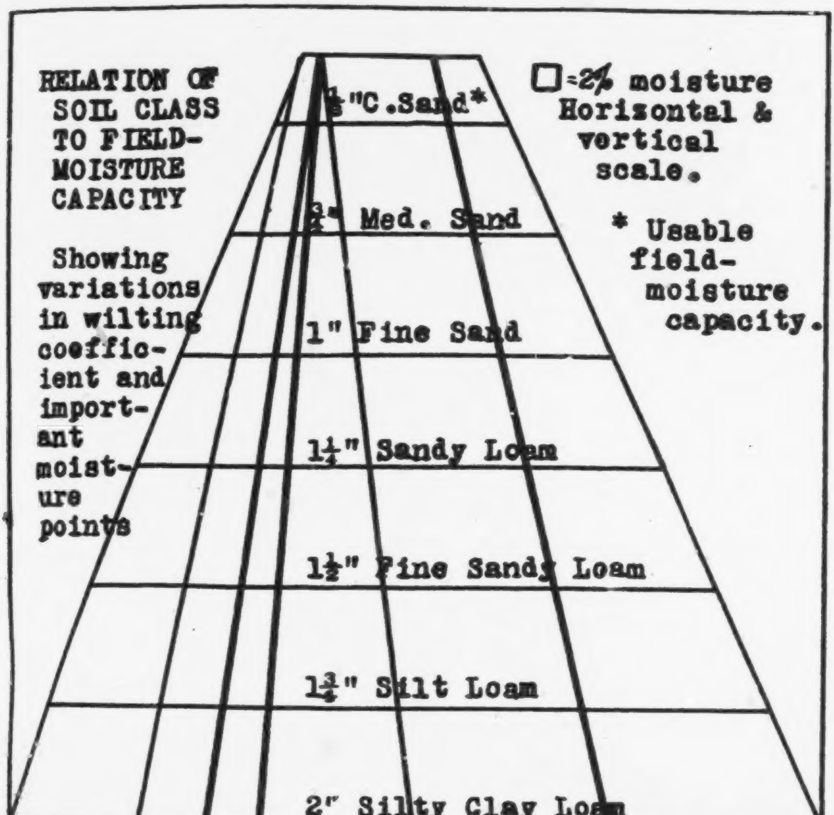

RELATION OF SOIL CLASS TO FIELD-MOISTURE CAPACITY
Showing variations in wilting coefficient and important moisture points
☐=2% moisture Horizontal & vertical scale.
* Usable field-moisture capacity.
½" C.Sand*
¾" Med. Sand
1" Fine Sand
1¼" Sandy Loam
1½" Fine Sandy Loam
1¾" Silt Loam
2" Silty Clay Loam
Oven Dry
Saturation Point
Muck & Peat
Hygroscopic Coefficient
Usable Water Capacity
Moisture Equivalent
Excess Point
Range Wilting Coefficient

Figure 1. Relation of soil class to field moisture capacity. Relations are not strictly linear for coarse soils. (*From Soil Sci. 14:163.*)

[fol. 374]

OREGON EXHIBIT No. 44

Analysis of Alleged Over-diversions 1933, all Quantities Expressed in Second Feet

Channel	Acres	Decreed at users weir	20% trans. loss	Total nec. at measuring point to deliver Dec. Amt.	July			August		
					Mean diversion	Under diversion	Over diversion	Mean diversion	Under diversion	Over diversion
West Crockett	342.05	12.83	3.21	16.04	14.13	1.91	....	13.86	2.18	....
East Crockett	220.98	8.28	2.07	10.35	10.71	....	.36	10.77	....	.42
Stillman	78.15	2.93	....	2.93	5.06	....	2.13	4.83	....	1.90
Ford	520.00	19.5	4.88	24.38	20.42	3.96	....	18.45	5.93	....
East Side and McCoy Stock	258.22	10.68	2.67	13.35	13.19	.16	....	12.50	.85	....
Milton Ditch Con. Spec. Duty	330.87	13.62	....	13.62	15.38	....	1.76	15.35	....	1.73
Powell	219.15	8.22	....	8.22	9.8	....	1.58	8.4	....	.18
Perkins Con. Spec. Duty	43.27	3.20	....	3.20	3.0	.20	....	2.88	.32	....
Tum-A-Lum	37.17	1.39	....	1.39	2.6	....	1.21	1.94	....	.55
Totals	2,049.86	80.65	12.38	93.48	94.29	6.23	7.04	88.98	9.28	4.78
Net over diversion in all above channels	....	.....	....	.....	.....	....	.81	.....	....	....
Net under diversion in all above channels	....	.....	....	.....	.....	....	....	....	4.50	....

(Milton Ditch)—Note: Any over-diversion, which in both July and August was under two-second feet was used to irrigate the lands upon the Finis Ditch, which lands have a priority in that waste water prior to 1909 for 107.5 acres. This right was awarded them by the old decree in 1912.

[fol. 375] OREGON EXHIBIT No. 45

[Title omitted]

Bridges in Oregon and Washington

Their Names and Respective Locations

[fol. 376] List of Bridges Across Walla Walla River

Oregon:

Dorothy, or Demaris, Bridge across S. Fork in N. W. ¼ S. W. ¼ Sect. 22, T. 5 N., R. 36 E. Bridge across N. Fork at Gaging Station 216 in N. W. ¼ N. E. ¼ Sect. 22, T. 5 N., R. 36 E. West's Bridge at intake of Spence Ditch in N. E. ¼ N. E. ¼ Sect. 20, T. 5 N., R. 36 E. Bridge at New Milton Power Plant in N. W. ¼ S. W. ¼ Sect. 18, T. 5N., R. 36 E. Bridge at head of Miller Mill Race in N. E. ¼ S. E. ¼ Sect. 12, T. 5 N., R 35 E. Red, or Cemetery, Bridge at head of Little Walla Walla River in S. W. ¼ N. E. ¼ Sect. 12, T. 5 N., R. 35 E. Milton Nursery Bridge at head of Hudson Bay Canal in N. E. ¼ N. W. ¼ Sect. 1, T. 5 N., R. 35 E. McCoy Bridge on line between Sections 24 and 25, T. 6 N., R. 35 E.

Washington:

Pepper Bridge on line between Lots 1 and 2, Sect. 13, T. 6 N., R. 35 E. State Highway Bridge on North and South Center line of Sect. 11, T. 6 N., R. 35 E. L. O. Kennedy Memorial Bridge just below Gardena Canal intake in S. W. ¼ S. W. ¼ Sect. 3, T. 6 N., R. 35 E. Blue Mountain Bridge on North and South Line between Sects. 4 and 5 T. 6 N., R. 35 E. Mission Bridge on line between Sects. 31 and 32, T. 7 N., R. 35 E. Whitman Bridge on line between Narcisse Raymond Donation Land Claim and Lot 2, Sec. 31, T. 7 N., R. 35 E. McDonald Bridge on line between Sections 33 and 34, T. 7 N., R. 34 E. Lowden Bridge in S. W. ¼ S. W. ¼ Sect. 29, T. 7 N., R. 34 E. Hasseltine Bridge in S. E. ¼ N. W. ¼ Sect. 3, T. 6N., R. 33 E.

[fol. 377]

WASHINGTON EXHIBIT NO. 46

Mechanical Analysis of Yakima Gravelly Loam
(fine earth.)

No.	Locality	Description	Organic Matter P. ct.	Gravel, 2 to 1 mm. P. ct.	Coarse sand, 1 to 0.05 mm. P. ct.	Medium sand, 0.5 to 0.25 mm. P. ct.	Fine sand, 0.25 to 0.1 mm. P. ct.	Very fine sand, 0.1 to 0.05 mm. P. ct.	Silt, 0.05 to 0.005 mm. P. ct.	Clay, 0.005 to0.001mm. P. ct.
6685	NW. corner No. 11-40, sec. 19, T. 7N., R. 36E.	Gravelly loam, 0 to 12 inches	1.50	3.12	6.26	3.92	11.50	21.70	44.34	7.88

From page 721 "Soil Survey of the Walla Walla Area, Washington, by J. Garnett Holmes, U. S. Bureau of Soils

[fol. 378]

EXHIBIT No. 47

Washington

Flow at Various Points of Walla Walla River in C. F. S.

June 14–30, 1933

Date	Stations 214 & 216	Nursery Bridge	McCoy Bridge	State Line	State Highway
June 14	524	300	..	315	..
15	514	300	..	320	..
16	478	216	..	262	..
17	435	206	..	205	..
18	387	..	..	205	..
19	330	..	..	205	..
20	300	25	..	46	..
21	282	32	..	34	38
21	...	52	..	40	..
22	259	28	22	36	40
22	...	7	..	30	37
23	241	3	18	28	34
23	...	...	..	26	..
24	225	3	14	25	30
24		38	12	23	28
25		2	18	29	30
25		1	12	30	33
25			..	23	28
26		1	11	21	26
27		1	9	20	27
28		1	10	21	28
28			10	20	27
29		1	9	20	26
30		0	8	20	24

At Nursery Bridge practically dry remainder of summer.

At McCoy Bridge: From 7 cfs. on July 1, to 1. cfs. on July 15, to 0.4 cfs. July 31. Dry after Aug. 10.

Hardesty Creek: Mean flow June 14–30: 3.4 Cfs.

Birch Creek: Flow steady at approximately 0.2 cfs.

[fol. 379]

Flow at Various Points of Walla Walla River

Fall 1933

Date	Nursery Bridge	Opposite Dugger Place	Below McCoy Bridge	State Line	State Highway
Oct. 28...	0.2	...	...	...	..
Oct. 29...	8	...	...	8	13
Oct. 30...	6	...	...	8	13
Oct. 31...	19	...	...	9	20
Nov. 1...	21	...	...	8	16
Nov. 2...	25	...	...	9	16
Nov. 3...	240	...	...	160	..
Nov. 18...	16	...	...	17	20
Nov. 20...	18	...	...	17	20
Nov. 27...	20	11	2	...	..
Nov. 28...	23	13	9	17	20
Nov. 29...	19	11	5	15	..
Nov. 30...	19	10	5	14	17
Dec. 1...	19	10	4	14	16
Dec. 2...	18	10	3	13	16
Dec. 4...	24	13	7	15	19
Dec. 5...	24	14	7	15	20
Dec. 6...	40	20	11	16	20
Dec. 7...	99	72	44	54	..
Dec. 8...	74	56	35	46	..
Dec. 9...	62	44	28	41	..
Dec. 10...	158	127	87	97	..
Dec. 11...	140	111	103	107	..
Dec. 12...	192	163	...	168	..
Dec. 13...	208	175	...	187	..
Dec. 14...	205	172	...	203	..
Dec. 15...	177	147	...	173	..
Dec. 16...	160	127	...	147	..

Hardesty Creek	2 cfs.
Birch Creek	negligible

Averages from Nov. 18 to Dec. 5, inclusive.

Nursery Bridge	20
State Line	15
State Highway	18½

FILE COPY

No. [redacted] 11 [redacted]

Office Supreme Court, U. S.
FILED
JUL 28 1931
CHARLES ELMORE CROPLEY
CLERK

IN THE

SUPREME COURT

OF THE

UNITED STATES
IN EQUITY

OCTOBER TERM, 1930.

THE STATE OF WASHINGTON, *Complainant,*

v.

THE STATE OF OREGON, *Defendant.*

ORIGINAL BILL OF COMPLAINT IN EQUITY

JOHN H. DUNBAR,
Attorney General,

JOHN C. HURSPOOL,
Assistant Attorney General,

Attorneys for Complainant,
State of Washington.

Office and Postoffice Address: Temple of Justice, Olympia, Wash.

JAY THOMAS, PUBLIC PRINTER

No. ....

IN THE

SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

OCTOBER TERM, 1930.

THE STATE OF WASHINGTON,
Complainant,
v.
THE STATE OF OREGON, *Defendant.*

APPLICATION FOR LEAVE TO FILE ORIGINAL BILL OF COMPLAINT

Comes now the complainant in said cause by John H. Dunbar, attorney general for the state of Washington, and solicitor and counsel for the complainant, and makes this application of the said complainant for leave to file in this court the bill of complaint in said cause, and said complainant herewith presents the bill of complaint which it proposes to file.

JOHN H. DUNBAR,
Attorney General of the State of Washington, and Solicitor and of Counsel for Complainant.

No. ....

IN THE

SUPREME COURT

OF THE

UNITED STATES

IN EQUITY

OCTOBER TERM, 1930.

THE STATE OF WASHINGTON, *Complainant*,

v.

THE STATE OF OREGON, *Defendant*.

ORIGINAL BILL OF COMPLAINT IN EQUITY

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

The State of Washington, by John H. Dunbar, attorney general of the state, under the direction of the Honorable Roland H. Hartley, governor of the state, and in compliance with the request of the Honorable Erle J. Barnes, director of the department of conservation and development, and Mr. Chas. J. Bartholet, supervisor of hydraulics of the state, charged with the regulation and diversion of water in this state, by leave of this Honorable Court first had and obtained, brings this, its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the state of Oregon in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; and respectfully sets forth and alleges as its cause of action:

That your orator is one of the states of the United States entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

That the defendant the state of Oregon is likewise one of the states constituting the United States of America entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed and devolving upon each and all of said states of the United States of America.

That the Walla Walla river is a small non-navigable stream of water rising in the Blue Mountains in the northeastern corner of the county of Umatilla in the state of Oregon, flowing thence first southwesterly and then northwesterly about twenty-five to thirty miles to the city of Milton, Oregon, thence in a northerly direction about five miles to the Washington-Oregon state line, thence northwesterly and westerly within the state of Washington a distance of about thirty miles, where it empties into the Columbia river.

That during the first twelve or fifteen miles of its course the said stream flows in a rugged mountainous country in a narrow canyon without any farming lands along its course. The remainder of the said stream, until it reaches Milton, Oregon, is in a narrow valley running from less than a quarter of a mile in width to a half of a mile in width, shut in by high hills. At or just above Milton, Oregon, the stream divides into two branches, one, locally known as the Tum-a-lum, and the other as the Little Walla Walla, which also divides into two branches known as the East Little Walla Walla and the West Little Walla Walla, all of which unite again about two miles after passing into the state of Washington. After the stream separates at or just above Milton, Oregon, it flows in a wide level valley. Several springs and small streams arise in this valley north of the city of Milton, Oregon, between the two branches, the waters of which springs and streams naturally flow into and join these two branches, either before or after they pass into the state of Washington.

That the rainfall along the whole course of the stream in the state of Oregon is such that for the successful growing of fruit, alfalfa and vegetables, irrigation is needed, though grain crops may be grown without irrigation except on gravelly soil, and this is true for about five miles along its course in the state of Washington, but along the remainder of its course crops cannot be grown without irrigation except along the immediate border of the stream where the land is subirrigated; that the rainfall is about twenty-five inches a year in the foothills above Milton, Oregon, but gradually decreases westerly until it is about fifteen inches where such stream enters the state of Washington, and from there it continues to decrease until where the stream enters the Columbia river the rainfall is about six inches a year and the land is desert.

That the soil along the stream is a volcanic ash fairly heavy along the upper reaches of the stream and wherever low lands along the course of the stream or springs or spring branches are subirrigated therefrom, these subirrigated lands ordinarily need no irrigation, but the soil along the westerly and more desert portion is light but capable of raising abundant crops with irrigation; and that there are in the territory immediately north and west of Milton, Oregon, considerable tracts of land which are mostly gravel, either from stream beds or wash therefrom during flood waters in former times.

That the water of the Walla Walla river comes from springs and from the melting of snow and rainfall in the Blue Mountains in which it rises, but after about the first of June of each year, very little of said flow comes from the melting of snow or rainfall directly and the springs which derive their supply from earlier snows and rains gradually decrease in flow so that ordinarily the flow in the latter part of July and during August of each year is greatly diminished in volume under that of the earlier months; that the flow of said stream varies from year to year with the amount of snow and rainfall in the mountains, but in normal years the flow of said stream varies from about 400 cubic feet per second in the early spring to about 150 cubic feet per second in late July and August. The flow thereof during the past eight or ten years has been decreasing owing to an increasing deficiency of rain and snowfall during said time until recently and the flow does not exceed two-thirds the normal flow.

That the lands riparian to said Walla Walla river both in Oregon and Washington were settled and segregated from the public domain mostly prior to the year 1870, the cultivation, however, being limited largely to the comparatively narrow strips of subirrigated land along the banks of the streams, except on the upper portions of the stream where, as hereinbefore alleged, grain crops could be grown without irrigation, the existence of such subirrigated lands being the chief cause of such early settlement; that, commencing about 1870, water began to be used for irrigation on adjacent lands which were not subirrigated by said Walla Walla river or its branches, and such use gradually increased until by the year 1892 there were irrigated from said stream system about twelve hundred acres of land in the state of Oregon and about eighty-five hundred acres of land in the state of Washington. Of the latter, about seven thousand acres lie in the arid belt and will not grow crops without irrigation. That to properly irrigate the lands irrigated at such time, the full amount of the water flowing in such streams during the late summer months, when irrigation was necessary, was required. That said lands and particularly said about seven thousand acres are in a high state of cultivation, devoted to the growing of fruits, alfalfa and other crops, and furnish homes for a large number of people, to-wit: in excess of one thousand people, and in their present state of cultivation and improvement, together with the supply of water which they have heretofore and prior to the wrongful acts of defendants, its officers and citizens hereinafter set out, have been and would be of great value in excess of $20,000.00.

That since the year 1892, there have been additional lands put under irrigation in the state of Oregon from time to time so that more and more of the full flow of said streams during the summer months have been taken therefrom and used upon lands in the state of Oregon, and more particularly has such use increased since about the year 1920; that the lands so irrigated have been located farther and farther away from the banks of such streams and the topography of the country is such that the waste and seepage water on such more distant lands does not return to the stream as was the case with earlier appropriations and uses; that, in addition thereto, the flood or excess waters of said streams in the early spring of the year were appropriated for early spring irrigation of large areas of land in the state of Oregon, all of which appropriations were subsequent to the appropriation and use of the waters of said streams in the state of Washington, and the appropriators of these flood waters increased from time to time their appropriations of such waters and, in disregard of the rights of the users of said waters in the state of Washington, extended their use of the waters of said streams beyond and after the flood waters had ceased to flow, thereby appropriating and using the waters to which the said lands in the state of Washington were and are entitled as well as lowering the water table along said stream and destroying the subirrigation of lands theretofore naturally subirrigated; that all of these diversions have been made under permits from the state of Oregon through its state engineer, which has thereby sanctioned and licensed the permanent wrongful use and consumption of said waters, and said state of Oregon, through its said state engineer, threatens to and will continue to issue permits and licenses for further wrongful diversions of said waters; that in addition to such wrongful appropriations of the waters of said stream the said defendant, through its said state engineer, has fixed the duty of water, *i. e.*, the amount of water which each irrigated acre is entitled to receive during the irrigation season upon the lands in such state, at an excessive amount and far greater than necessary or proper, considering the rights of the users of the waters from said stream in the state of Washington, and such excessive duty of water and the use thereof by the residents of the state of Oregon have deprived and will continue to deprive the persons entitled to said waters in the state of Washington of the waters to which they are entitled.

That by reason of such acts, the prior appropriators of the waters from said stream in the state of Washington have been and are being deprived of sufficient water to properly irrigate their said lands, are unable to successfully grow crops, their perennial crops and orchards are being destroyed, and, unless the defendant, its officers and citizens are enjoined and restrained from continuing such wrongful diversion and from increasing the same, such lands in the state of Washington will be rendered wholly unproductive, to the great and irreparable injury of the owners of said lands and of this complainant.

Your orator further shows that the states of Oregon and Washington both recognize by their statutes and the decisions of their highest courts the doctrine of riparian rights so that the owner of land riparian to the stream is entitled to his proportionate share of the waters flowing in such stream for the purpose of irrigation, subject to the requirement that such riparian use within a reasonable time and limiting such riparian right to such beneficial use, together with the doctrine of appropriation whereby the first appropriator in time is first in right subject only to previously acquired riparian rights, the amount of the appropriation being dated as of the time when the work was instituted for the putting of water to such beneficial use and to the extent that such water is applied to a beneficial use by the exercise of due diligence. That your orator is informed and believes that the lands to which water has been appropriated in recent years have been nonriparian lands or lands which have lost any riparian right by the failure to irrigate the same within a reasonable time.

That the state engineer of the state of Oregon is authorized by law to supervise the appropriation and distribution of the waters in such state; that request has been made upon him for an equitable division of the waters of said stream, but that he has refused to recognize the rights of the state of Washington and its citizens to any of the waters of said stream.

That the state of Oregon, unless restrained by this Honorable Court, will through its officials, agents, representatives, servants or other citizens or residents or corporations continue to use and divert the waters of the Walla Walla river to which the citizens and state of Washington are justly entitled and to increase such use and diversion until the whole of said waters are diverted and the citizens and state of Washington deprived thereof during the irrigating season.

Your complainant, the state of Washington, offers to do full and complete equity to the state of Oregon in respect to the administration, diversion and use of the waters of the Walla Walla river and its tributaries; but this complainant alleges that no other court than this Honorable Court, upon the general doctrine of law or the constitution of the United States, has any authority or jurisdiction whatsoever to adjudicate upon said matters.

Your complainant has no adequate remedy at law, nor any remedy in any court whatsoever, except this supreme court of the United States, in respect to the matters and things herein set forth.

All of which actions, doings and pretenses of the said defendant, its officers, agents and citizens are contrary to equity and good conscience and tend to the manifest wrong, injury and oppression of your orator and its citizens in the premises. In consideration whereof and for as much as your orator is entirely remediless in the premises according to the strict rules of the common law and can only have relief in a court of equity where matters of this nature are properly cognizable and relievable;

To the end, therefore, that the defendant state of Oregon may, if it can, show why your orator should not have the relief hereby prayed for and may according to its best and utmost of its knowledge, information and belief, full, true and direct and perfect answer make to all and singular the matters hereinbefore stated and charged as fully and particularly as if the same were hereinafter repeated and they were thereunto distinctly interrogated (but not under oath, answer under oath being hereby expressly waived). Your orator prays this Honorable Court to issue its writ of subpoena in due form of law and according to the course and practice of the court directed to said defendant state of Oregon, commanding it to appear at a certain day and under certain pain and penalty therein to be specified to appear before this Honorable Court to answer all and singular the matters and things hereinbefore set forth (but not under oath, answer under oath being expressly waived) and to stand to perform and abide such order and decree therein as to Your Honors shall seem meet.

And your orator prays that this Honorable Court may exercise its sole jurisdiction over the determination of the respective rights of the states of Washington and Oregon and their citizens to the use of the waters of the Walla Walla river and its tributaries in said states; and determine and adjudicate such rights, and apportion the said waters in accordance with the rights thereto; that the defendant be enjoined and restrained from diverting or permitting to be diverted and used in the state of Oregon any of the waters of said stream or streams to which the defendant and its citizens are found not to be entitled and that it be required to permit and cause to be permitted to flow into the state of Washington the waters of said Walla Walla river and its tributaries to which it and its citizens are found to be entitled, and that your orator may have all such other and further relief as the nature and circumstances of the case may require and as to this court shall seem just and equitable.

JOHN H. DUNBAR,
Attorney General,

JOHN C. HURSPOOL,
Assistant Attorney General,

Attorneys for Complainant,
State of Washington.

State of Washington, }
County of Thurston. } *ss.*

John H. Dunbar, being duly sworn on his oath according to law, deposes and says: That he is the attorney general of the state of Washington and as such, at the direction and upon the request of the governor of said state, exhibits the foregoing bill of complaint; that he has read the said bill of complaint, and that the facts therein set forth, save and excepting where averred on information and belief, are true, and that as to the facts therein alleged as upon information and belief affiant is credibly informed and verily believes that the said facts are true.

John H. Dunbar.

Subscribed in my presence and sworn to before me this 23d day of April, 1931.

Seal) Faith Y. Koffenberger
Notary Public in and for the State of Washington, residing at Olympia.

FILE COPY

FILED
OCT 5 1931
CHARLES

Original No. 11

IN THE

Supreme Court of the United States

IN EQUITY

OCTOBER TERM, 1930

THE STATE OF WASHINGTON,
Complainant,
v.
THE STATE OF OREGON,
Defendant.

Answer to Original Bill of Complaint in Equity

Original No. ....
IN THE

Supreme Court of the United States

IN EQUITY

OCTOBER TERM, 1930

THE STATE OF WASHINGTON,
Complainant,
v.
THE STATE OF OREGON,
Defendant.

Answer to Original Bill of Complaint in Equity

Comes now the defendant, the State of Oregon, by I. H. Van Winkle, Attorney General, with the approval of Honorable Julius L. Meier, Governor of the State of Oregon, and by leave of court first had and obtained, for answer to complainant's Bill of Complaint, filed herein at the October term, 1930, admits: That the state of Washington is one of the states of the United States entitled to enjoy all of the privileges, rights, and powers and with all of the duties, including the duty of protecting the rights, interests and properties of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

Admits that the defendant, the State of Oregon, is likewise one of the states of the United States entitled to enjoy all the privileges, rights, and powers, and with all the duties, including the duty of protecting the rights, interests and properties of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

This defendant admits that the Walla Walla river is a small non-navigable stream of water rising in the Blue mountains in the northeast corner of the county of Umatilla and state of Oregon, flowing thence, first, southwesterly and thence northwesterly about 25 or 30 miles to the city of Milton, Oregon, thence in a northerly direction about five miles to the Washington-Oregon state line, thence northwesterly and westerly within the state of Washington, a distance of about 30 miles, where it empties into the Columbia river.

This defendant denies that said Walla Walla river consists of only one branch or stream from its head to the city of Milton, Oregon, and alleges that for about 15 or 20 miles from its source said Walla Walla river is divided into two branches, one arising to the north of a steep and narrow ridge and known as the North Fork and the other to the south of said ridge and known as the South Fork; that said two streams unite at a point about four miles east of the city of Milton; that each of said forks of said streams flows between high hills and the lands along said North Fork are farmed for a distance of about five miles east of said junction and the lands along said South Fork are farmed for a distance of about 10 miles east of said junction.

This defendant admits that the remainder of said stream from said junction until it reaches the city of Milton, is in a narrow canyon running from less than one-fourth of a mile in width to one-half mile in width and shut in by high hills.

This defendant denies that the Walla Walla river divides into two branches above the city of Milton; but admits that at said city of Milton it divides into two branches, one known as the Tum-a-lum and the other as the Little Walla Walla.

This defendant denies that the Little Walla Walla divides into two branches known as the East Little Walla Walla or the West Little Walla Walla in the state of Oregon and denies that said two streams unite again about two miles after passing into the state of Washington or elsewhere. That as a matter of fact, said Little Walla Walla divides at the city of Freewater in Umatilla county, Oregon, into two branches known as the Crockett branch and the Ford branch and said Crockett branch divides into the east and west branches of the Crockett. That said east branch of the Crockett discharges into the east prong of the Little Walla Walla Spring branch which empties into the East Little Walla Walla across the line in the state of Washington and said Ford branch and the said west branch of the Crockett lead into the west prong of the Little Walla Walla Spring branch which empties into the West Little Walla Walla river across the line in the state of Washington; and defendant alleges that during the summer, or irrigation season of the year, no water is discharged into the Walla Walla river from the east or the west branches of the Crockett or from the Ford branch.

This defendant admits that after said stream separates at Milton, Oregon, it flows in a wide level valley and several springs and small streams arise in this valley north of the city of Milton between the two branches, the waters of which springs and streams naturally flow into and join the two branches either before or after they pass into the state of Washington; but the amount of flow or discharge from such springs or streams is limited during the summer and irrigation season of each year.

Defendant admits that the rainfall along the whole course of the stream in the state of Oregon is such that for the successful growing of fruit, alfalfa and vegetables, irrigation is needed though grain crops may be grown without irrigation, except on gravel soil; but denies that this is only true for about five miles along its course in the state of Washington and alleges that grain can be and is successfully grown without irrigation for a distance of 10 or 12 miles along the course of said stream in the state of Washington westerly from where said Walla Walla river enters said state and that along the remainder of its course, crops can not be grown without irrigation except along the immediate border of the stream where the land is sub-irrigated.

This defendant admits that the rainfall is about 25 inches a year in the foothills above Milton, Oregon, but denies that the rainfall gradually decreases westerly until it is about 15 inches where said stream enters the state of Washington, but alleges that at said point it is not less than about 17½ inches and admits that from there it continues to decrease until where the stream enters the Columbia river the rainfall is about six inches a year and the land is desert.

Defendant admits the soil along the stream is a volcanic ash fairly heavy along the upper reaches of the stream and wherever low lands along the course of the stream or springs or spring branches are sub-irrigated therefrom, those sub-irrigated lands ordinarily need no irrigation, but the soil along the westerly and more desert portion is light but capable of raising abundant crops with irrigation; and that there are in the territory immediately north and west of Milton, Oregon, considerable tracts of land which are mostly gravel, either from stream beds or washed therefrom during the flood waters in former times. But defendant denies that these are the only lands irrigated and subject to irrigation along said stream and its tributaries and the territory drained thereby in the state of Oregon that is rocky and gravelly and alleges that the lands along the North Fork and the South Fork of the Walla Walla river, and along the Walla Walla river above the city of Milton, and the lands lying along and adjacent to the said Walla Walla river, and the said Tum-a-lum and on and along the west prong of the Little Walla Walla river and the east prong of the Little Walla Walla river, Lewis Spring branch, Dry creek and a strip of land that extends for about four miles in a westerly direction from the Walla Walla river as it flows through Milton, Oregon, and for a distance of about two and one-half miles extending in a northerly direction from the bluff about four miles westerly from the city of Milton and the lands between the Tum-a-lum river and the Little Walla

Walla and the lands east of the said Tum-a-lum river in the state of Oregon, are gravelly or the greater portion thereof, and said gravelly soil permits excessive evaporation, seepage, and waste and such soil requires a higher duty of water than volcanic ash lands or sandy loam lands.

Defendant admits that the waters of the Walla Walla river come from springs from the melting of snow and rainfall in the Blue mountains in which it rises but after about the first of June of each year very little of said flow comes from the melting of snow or rainfall directly, and the springs which derive their supply from the earlier snow and rains, gradually decrease in flow so that ordinarily the flow in the latter part of July and during August of each year is greatly diminished in volume under that of the earlier months; that the flow of said stream varies from year to year with the amount of snow and rainfall in the mountains, but in normal years the flow of said stream varies from 400 cubic feet per second in the early spring, but defendant denies that it varies to about 150 cubic feet per second in late July or August or that the average mean flow of said stream is 150 cubic feet per second in late July or August or any greater amount than about 80 cubic feet per second during the last 8 or 10 years.

Defendant admits that the flow thereof during the past 8 or 10 years has been decreasing, owing to the increasing deficiency of rainfall and snow during said time until recently, but defendant denies the flow does not exceed two-thirds the normal flow or that said flow amounts to two-thirds of the normal flow and alleges that in late July and August the same amounts to about 80 cubic feet per second of time.

Defendant admits that the lands riparian to said Walla Walla river both in Oregon and Washington were settled and segregated from the public domain mostly prior to 1870.

Defendant denies that the cultivation of lands along the banks of said streams was limited largely to comparatively narrow strips of sub-irrigated land along the banks of the stream or except on the upper portions of said streams or where grain crops could be grown without irrigation or that the existence of such sub-irrigated lands was the cause of such early settlement.

Defendant alleges that on and along said streams, their branches and tributaries in the state of Oregon during and prior to said 1870, there had been diverted and appropriated from said stream, its branches and tributaries in Umatilla county, Oregon, by means of ditches, dams, and headgates for stock, domestic, irrigation, and power purposes about 19 cubic feet per second of the water of said streams and the same had been applied to power purposes or to the irrigation of about 700 acres of land which required the aid of artificial irrigation for the production of remunerative crops and said waters were then devoted and ever since have been applied to beneficial uses and purposes in the production of power, of grain, vegetables, alfalfa, fruits, pasture, shade and ornamental trees and the keeping up and maintaining of homes on said lands.

Defendant denies that about the year 1870 the waters of said stream or its tributaries first began to be used or that the same had not theretofore been used for irrigation on adjacent lands or on lands which were not sub-irrigated by said Walla Walla river or its branches, but said defendant admits that such uses gradually increased.

Defendant denies that about the year 1892 there were irrigated from said stream system only about 1,200 acres in the state of Oregon and defendant denies that in the year 1892 not more than 1,200 acres were irrigated from said stream in said state of Oregon; and alleges that in 1892 fully 5,831 acres of land were irrigated in Umatilla county, Oregon, from the waters of said stream and its tributaries.

Defendant denies that about 8,500 acres of land were irrigated or using water for the production of crops upon lands in the state of Washington at the end of or during the said year of 1892 or that any other or greater number of acres than 6,167.69 acres were irrigated from said stream or its tributaries in the state of Washington; and defendant alleges that of said 6,167.69 acres irrigated during 1892, 3,024 acres thereof lay along the Walla Walla river, the east and west branches of the Little Walla Walla, along Mud and Pine creek and that said lands are principally sub-irrigated from the waters of said streams and defendant further alleges that no part of said 7,000 acres in the arid belt was placed under irrigation until the year of 1898 when 80 acres were irrigated; that thereafter the reduction of said lands to cultivation was slow, small amounts being added from year to year to the irrigated portion thereof until the year 1907, when about 1,500 acres were under irrigation and thereafter about the year 1908 or 1909 said body of arid lands being short of water for irrigation and development purposes, entered into some arrangement with the city of Walla Walla, Washington, to divert the sewage waters of said city for use upon said arid tract; that those in charge of the reclamation of said tracts thereupon constructed a pipe line for a distance of about four and one-half miles from the city of Walla Walla which was about three feet in diameter to the said lands, and about the year

1912 said sewage water was first delivered thereto; that said pipe line carried about 16 cubic feet per second of water to said tract.

Defendant admits that said 7,000 acres of land lying in the arid belt in the state of Washington along the Walla Walla river will not grow crops without irrigation but defendant denies that to properly or at all irrigate said 7,000 acres of land in 1892 or any part thereof, the full or any amount of water flowing in such stream or streams during the summer months or when irrigation was necessary or any irrigation was necessary, was required; and defendant denies that said lands or any part thereof were irrigated at said time.

Defendant denies that said lands or particularly 7,000 acres or any greater number of acres than about 5,000 acres are in a high, or any state of cultivation or devoted to the growing of fruits, alfalfa, or other crops or furnishing homes for a large number of people or any number in excess of about 600 or that in their present or any state of cultivation or improvement or together with a supply of water they have heretofore or prior to the wrongful or any acts of the defendant or its officers or its citizens hereinafter or elsewhere alleged have been or would be of great value or any value in excess of $20,000 or any other sum.

Defendant admits that since the year 1892 there have been additional lands put under irrigation in the state of Oregon from time to time so that more and more of the full flow of said stream during the summer months has been taken therefrom and used upon lands in the state of Oregon.

Defendant denies that more particularly has such use increased since about the year 1920 or that lands so irrigated have been located farther away from the banks of said streams or that the topography of the country is such that the waste or seepage waters on such or any more distant lands does not return to the stream as was the case with the earlier appropriations or uses.

Defendant denies that in addition thereto the flood or excess waters of said streams in the early spring of the year were appropriated for early spring irrigation of large areas of land in the state of Oregon or that all or any of which appropriations were subsequent to the or any appropriation or use of the waters of said streams in the state of Washington or the appropriators of these flood waters increased from time to time their appropriation of such or any waters in disregard of the or any right or rights of the users of said or any waters in the state of Washington or extended the use of the waters of said stream beyond or after the flood waters ceased to flow or thereby appropriating or using the or any waters to which the said or any lands in the state of Washington were or are entitled or as well as lowering the water table along the said or any streams or destroying the sub-irrigation of lands theretofore or at all sub-irrigated.

Defendant admits that diversions of water from said streams have been made under permits from the state of Oregon through its state engineer but alleges that since the year 1909 said permits have been issued and granted by said state engineer under and by virtue of a general law of the said state of Oregon.

Defendant denies said State of Oregon or its said state engineer sanctioned or licensed the permanent or any wrongful use or consumption of said or any water of said streams or that said State of Oregon through its state engineer or any one threatens to or will continue to issue permits or licenses for any wrongful diversions or use of said waters of said streams, further or otherwise.

Defendant further denies that in addition to such or any wrongful appropriations of the waters of said or any streams the said defendant through its said state engineer or anyone has fixed the duty of water, i. e., the amount of water which each irrigated acre is entitled to receive during the irrigation season upon the lands in said state at an excessive amount or far or at all greater than necessary or proper considering the rights of the users of the water from said streams or any stream in the state of Washington or that said or any excessive duty of water or the use thereof by the residents of the state of Oregon has deprived or will continue to deprive the persons or any person entitled to said water in the state of Washington of the water to which they or any of them are entitled.

Defendant denies that by reason of such or any act or acts the prior or any appropriators of water from said or any stream or streams in the state of Washington have been or are being deprived of sufficient water to properly or at all irrigate their said or any lands, or are unable to successfully grow crops or that their perennial or any crops or orchards are being destroyed, or unless defendant, or its officers or citizens, or anyone, is or are enjoined or restrained from continuing such or any wrongful diversion, or from increasing the same, such or any land in the state of Washington or elsewhere, will be rendered wholly or at all unproductive to the great or irreparable injury of the owners of said or any lands or of this or any complainant.

This defendant, by way of further defense, alleges that the state of Washington, its municipal corporations and people have increased from year to year without regard to the rights of former irrigators their irrigated acreage, and have unreasonably and excessively increased the amount of water taken from said stream and its tributaries, and have caused and are causing the loss and injury to the irrigators in the Walla Walla county, if they are suffering from a lack of sufficient water to irrigate their lands from the Walla Walla river and its tributaries as in former years.

Defendant further alleges that Walla Walla county, Washington, and that part thereof in which the Walla Walla river, Mill creek, Yellow Hawk, Garrison and Titus creeks, Cottonwood, Blue and Reser creeks, Russel, Pine, Mud and Little Mud, Doan and Stone creeks lie is in the same water shed as the Walla Walla river, the Tum-a-lum river and the tributaries of the said Walla Walla river and the said Tum-a-lum river upon the Oregon side of the state line between the state of Oregon and state of Washington; that all of said streams in the county of Walla Walla are tributaries of the said Walla Walla river or of some stream which leads into the said Walla Walla river in said county and state.

Defendant further alleges that Walla Walla is a municipal corporation having a population of about 15,000 to 20,000 people; that said city appropriates and has used, for municipal purposes from the head waters of Mill creek, in the state of Oregon, which said stream is the principal tributary of the Walla Walla river in the state of Washington, from 22 to 28 cubic feet per second of water; that said water is conveyed away from the said Mill creek and not permitted to flow into the Walla Walla river with the other waters thereof, but consumed by said city for municipal purposes.

Defendant further alleges that there has been appropriated and used since the year 1919 in Walla Walla county, Washington, up to the end of the year 1926, water from the streams hereinbefore named for the irrigation of 3,490.76 acres placed under irrigation since 1919 in said county and state and that during said period of time only 1,573.98 acres of land have been placed under irrigation from the said Walla Walla river and its tributaries in the state of Oregon.

That the supervisor of hydraulics of the state of Washington, who is charged with regulation and diversion of the waters of said state, has established an excessive duty of water for use upon said lands in said state of Washington and has permitted and allowed the appropriators and users of water between said year 1919 and the latter part of the year 1926 to use one cubic foot per second of the water of said streams for each 75 acres of land irrigated from April 1 to July 1 and one cubic foot of water per second to each 100 acres of land from July 1 to October 1 of each year, and from October 1 to April 1 of each year one cubic foot of water per second to each 50 acres of land so irrigated; that said irrigators in the state of Washington during the said time have increased their use and used a greater amount of water upon lands in said county of Walla Walla from said streams naturally tributary to the Walla Walla river than the state of Oregon or its people have increased their use or used from said stream and its tributaries in Umatilla county, Oregon, during said time.

That the state engineer of the state of Oregon who has charge of the distribution of the waters of the state of Oregon by permits has established the duty of water as one-half inch to the acre for the irrigation season in said territory and has made all permits granted since the year 1909 for the use upon lands irrigated under permits in the state of Oregon subject to all prior or existing rights; that in the year 1926 there was a greater quantity of acres irrigated in Walla Walla county, Washington, than in Umatilla county, Oregon, from the Walla Walla river and its tributaries; that in the state of Washington during said year there were 25,269 acres under irrigation and water had been alloted to each acre thereof; that 23,271 acres were farmed and irrigated while 2,018 acres were under existing ditches in various stages of development, and said duty of water adopted by the supervisor of hydraulics of the state of Washington applied to said lands so irrigated; and during said year the state of Oregon had but 18,269 acres under irrigation from said stream and its tributaries, all of which had been appropriated, diverted and used as hereinbefore alleged.

That development of a large body of land in Walla Walla county, Washington, known as the Attalia Project, was commenced about the year 1904, and approximately 2,400 acres thereof were placed under irrigation; that thereafter in the year 1926 two spans of a bridge carrying a flume across the Walla Walla river were destroyed during high water, thereby making it impossible to deliver any water to said land without the reestablishment of said flume; that in the same year, a section of earth fill to the dam at the point where water was diverted from the Walla Walla river for said Attalia Project, was washed out for a distance of about 150 feet, said fill being about 25 feet high; that neither said flume nor said fill has ever been replaced; that during the year 1931 only about 100 acres of said land have been irrigated by pumping direct from the river and from about 10 to 14 cubic feet per second of water, during the dry season of 1931 have flowed into the Columbia river and below said Attalia Project; and that neither the state of Washington, nor its people, are attempting to utilize said water, but are permitting the same to flow to waste; that at the mouth of the Touchet river, about nine miles up the Walla Walla river from the said Attalia Project, during the dry season of 1931 fully 20 cubic feet per second of water flowed to waste, that neither said state nor its people made any effort to apply the same to any beneficial use or purpose.

This defendant admits that the state of Oregon and the state of Washington both recognize by their statutes and the decisions of their highest courts the doctrine of riparian rights before 1909, but this defendant denies that the owner of land riparian to a stream in the state of Oregon is entitled to his proportionate share of the waters flowing in such stream for the purpose of irrigation or subject to any such requirements as that such riparian use within a reasonable time or limiting such riparian right to such beneficial use or together with the doctrine of appropriation whereby the first appropriator in time is first in right, subject only to previously acquired riparian rights or that the amount of the appropriation is to be dated as of the time when the work was instituted for the putting of water to such beneficial use by the exercise of due diligence.

This defendant, by way of defense, alleges that in the year 1909, the legislature of the state of Oregon passed an act providing a system for the regulation, control, distribution and use of the waters of said state and such act provides that subject to existing rights, all waters within the state of Oregon may be appropriated for beneficial use, and that any person intending to acquire the right to beneficial use of any water shall, before commencing the construction of any ditch or other works, make application to the state engineer for a permit to make such appropriation. Said act also provides that any person who shall wilfully divert or use any water to the detriment of others without compliance with law, shall be deemed guilty of a misdemeanor; actual application of water to beneficial use prior to the passage of the act by or under authority of any riparian proprietor or of his or its predecessor in interest shall be deemed to create in such riparian proprietor a vested right to the extent of the actual application to beneficial use.

That since the passing of the act of 1909 by the legislature, the state of Oregon by its highest tribunal has decided that "A settler upon a non-navigable stream has an election, either to rely upon his rights as a riparian proprietor or to make an appropriation of the water, if it is subject to appropriation, and claim as an appropriator" and "the right of appropriation is incompatible with the rule of riparian proprietorship. The doctrine of appropriation excludes the idea of equality and makes each water right superior to all others subsequently initiated * * * while the characterizing feature of riparian ownership, when applied to irrigation, is equality or, perhaps to speak more exactly, the right of each person is correlated with the right of every other person, although a riparian owner may take all the water in a stream if needed to satisfy domestic wants," and ever since such decision was made the rules there announced have been and are now the law of said state. It is further provided in said act that where any riparian proprietor or under his authority or under authority of his or its predecessor in interest, any person or corporation shall, at the time this act is filed in the office of the secretary of state be engaged in good faith in the construction of works for the application of water to a beneficial use, the right to take and use such water shall be deemed vested in such riparian proprietor provided such works shall be completed and said water devoted to a beneficial use within a reasonable time after the passage of this act, to be determined by the state

Defendant denies that the lands to which water has been appropriated in recent years have been non-riparian lands and, or lands which have lost any riparian right or rights by failure to irrigate the same within a reasonable time or at all.

This defendant admits that the state engineer of the state of Oregon is authorized by law to supervise the appropriation and distribution of the waters in said state, but this defendant denies that request has been made upon him for an equitable division of the waters of said stream, or any division thereof except one dictated by the state of Washington, its officers, servants, agents, and attorneys, and denies that he has refused to recognize the right of the state of Washington or its citizens to any of the waters of said stream and alleges the fact to be that said state engineer and the people of the state of Oregon permit and allow all and more of the water than that to which the state of Washington is entitled to flow across the line between the said two states without interference, and the said state of Washington is permitting and allowing the same to flow to waste and not applying the same to any beneficial use or purpose.

Denies that unless restrained by this Honorable Court, the state of Oregon will, through its officials, or agents, or representatives, or servants, and other citizens, or other citizens and residents or residents and corporations or corporations continue to use or divert the waters of the Walla Walla river, or any part thereof, to which the citizens of said state of Washington, or either of them, are justly entitled, or to increase such use or diversion until the whole of said waters are diverted or the citizens or the state of Washington deprived thereof during the irrigation or any other season.

Denies that all or any actions or doings or pretenses of said defendant or its officers or agents or citizens are contrary to equity or good conscience or tend to the manifest or any wrong or injury or oppression of the state of Washington or its citizens or anyone in the premises.

This defendant by way of further defense to plaintiff's bill of complaint herein alleges that the greater part of the rights to the use of the waters of said Walla Walla river and its tributaries were adjudicated and determined more than 20 years ago by the courts of the said state of Oregon and said appropriators whose rights and interests therein were so determined have ever since held and still hold the waters of said streams pursuant to the provisions of said decree, and said rights are valuable property rights that have become vested in the individual appropriators and their successors under the constitution and laws of the state of Oregon and of the United States, and plaintiff's bill of complaint is an attempt to deprive the owners thereof of their property rights therein, but neither the state of Oregon nor the United States are entitled to divest such owners of such property rights without due process of law.

That in the year 1888, 2,250 inches of the waters of said stream measured under a 6-inch pressure, miners' measurement, were appropriated for power purposes and in 1898 500 additional inches of water measured under said 6-inch pressure, miners' measurement, were appropriated for power purposes from said streams and other amounts of water were appropriated from said streams at various times both before and after said dates for power and irrigation uses, all of which were diverted at said times from the channel of the Walla Walla river and from the Tum-a-lum river and used for power and irrigation purposes in a northwesterly direction from said point of diversion and all said waters so diverted were discharged into the Little Walla Walla river, and thereafter flowed, and still continue to flow away from said main stream in such northwesterly direction from a point just below the forks of the Tum-a-lum and Walla Walla rivers in the city of Milton.

This defendant by way of a further defense to plaintiff's bill of complaint alleges that said Tum-a-lum river in early days carried the main flow of the waters of the Walla Walla river, but for about 40 years or more last past said Tum-a-lum river has been absolutely dry during the summer and irrigation season of each year from a point about four miles above the state line to a point about two miles above the said state line, but that water reappears in said stream about two miles above the state line on the Oregon side and flows from there down past the state line into the state of Washington, and said stream from the point where it so reappears is fed by many springs, seepage holes, and marsh spots.

This defendant, the State of Oregon, for a further defense to plaintiff's Bill of Complaint on file herein alleges that said state of Oregon and its people diverted, appropriated and used, in good faith, under a claim of right and color of title, pursuant to the laws of the state of Oregon, and the recognized custom of appropriating water from said streams in said territory, at said time, and applied to beneficial uses from about the year 1864 to 1893, water from said river and its tributaries for the irrigation of 5,831 acres of land and about 4,000 miners' inches measured under a 6-inch pressure for power purposes and have ever since held and used said waters for said purposes, and from 1892 to 1909 6,712.73 acres and from 1908 to 1921 3,042.82, and from 1920 to 1927 1,573.98, and said appropriators have taken, used, held, and carried away the said waters of said stream openly, notoriously, and adversely to the state of Washington, its citizens and all the world since said dates hereinbefore alleged.

That during the times hereinbefore mentioned the said state of Oregon and its people have built dams, head-gates, main and lateral ditches, leveled and cultivated said lands, planted orchards, vineyards, pastures, lawns, meadows, alfalfa fields, ornamental and shade trees, and built and established homes upon the said lands, and constructed roads and highways thereto and therefrom, and expended enormous sums of money in doing the said work and making the said improvements, and during all of said times the said state of Washington and its people had notice and actual knowledge of said development, improvements, and expenditure of time, labor and money, and neither the said state of Washington nor its people have ever protested against the diversion, appropriation or use of the waters of said streams for the purposes hereinbefore enumerated, and by reason of the acts, conduct, and doings of the said state of Washington, its agents, servants, people and corporations, it and they are and ought to be estopped from claiming or asserting that the state of Oregon or its people are or have been damaging them or any of them, or inflicting any wrong or injury upon them, or any of them, and estopped from asserting or claiming any right or interest in or to the waters of said stream so appropriated or used, and it and they ought to be estopped from interfering with the said appropriations or diversions from said streams or any of them.

That the states of Oregon and Washington both recognize by their statutes and the decisions of their highest courts the same principles of law as to adverse possession, laches and estoppel and the limitation of time within which real property may be recovered.

WHEREFORE, the State of Oregon, having fully answered the Bill of Complaint of the State of Washington, filed in the above entitled suit, prays that said suit be dismissed and that the state of Oregon have such other and further relief as to this Honorable Court may seem mete and equitable, including defendant's costs and expenses.

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